

AX6L

User's Guide

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AX6L

Mainboard

User's Guide

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FCC Class B Radio Frequency

Declaration of Conformity

This equipment has been tested and found to comply with the limits for a Class B Subassembly -CPU Board device, pursuant to Part 15 of FCC Rules. Operation is subject to the following two conditions: 1. This device may not cause harmful interference, and 2. This device must accept any interference received, including interference that may cause undesired operation.

Equipment Classification : FCC Class B Subassembly - CPU Board
Type of Product : Intel Pentium II PCI/ISA ATX Motherboard
CPU Frequencies : 333/300/266/233 MHz
Chipset(s) : Intel 440LX



The limits of FCC Part 15 Class B are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-
-
-
1. Reorient or relocate the receiving antenna.
 2. Increase the separation between the equipment and receiver.
 3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 4. Consult the dealer or an experienced radio/television technician for help.

Notice 1:

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2:

Shielded interface cables, if any, must be used in order to comply with emission limits.

Purpose and Scope

This manual tells how to install and configure the system board.

Organization

Chapter 1, **Overview**, covers the introduction and specifications of the system board and special features.

Chapter 2, **Hardware Installation**, describes hardware jumpers, connectors and memory configuration. There are user friendly drawings to locate jumper and connector.

Chapter 3, **AWARD BIOS**, explains the system BIOS and tells how to configure the system by setting the BIOS parameters.

Chapter 4, **Installing System Component**, includes 3D drawing and step by step procedures for first time DIY user to install the system board, CPU, SIMM/DIMM, cable and add expansion cards.

Appendix A, **Jumper Table Summary**, gives you a tabular summary of the jumper settings discussed in Chapter 2.

Appendix B, **Frequently Asked Question**, collects most frequently asked question of this product.

Appendix C, **Troubleshooting Guide**, includes first aid information you need if you meet trouble, the WWW address and worldwide service telephone/fax are also included.

Appendix D, **AOpen Best Products**, includes the best sale and recommended product specifications of AOpen.

Conventions

The following conventions are used in this manual:

Text entered by user, default settings, recommended selections Represent text input by the user, default settings and recommended selections

<Enter>, <Tab>, <Ctl>, <Alt>, <Ins>, , etc Represent the actual keys that you have to press on the keyboard.



Note:

Gives bits and pieces of additional information related to the current topic.



Warning:

Alerts you to any damage that might result from doing or not doing specific actions.



Caution:

Suggests precautionary measures to avoid potential hardware or software problems.



Important:

Reminds you to take specific action relevant to the accomplishment of the procedure at hand.



Tip:

Tells how to accomplish a procedure with minimum steps through little shortcuts.

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Chapter 1

Overview

The AX6L is a new generation Pentium II based system board that utilizes Intel **82440LX** chipset on **ATX** PCI/ISA platform. This chipset is designed for Pentium II CPU, and supports new architectures such as high speed **AGP** graphic port, **SDRAM**, **Ultra DMA/33**, **Bus master IDE** and **USB** port. It has **four Dual in-line Memory Module (DIMM)** that allow to mix 3V EDO and SDRAM memory and expand up to a maximum of **1GB**. There is no second level cache onboard, since the cache is on the **Pentium II CPU card (connector SLOT1)**. Also, AX6L uses **2M bit Flash ROM** BIOS to reserve for future new functions.

Not only above features, AX6L implements most advanced technology such as user-friendly Jumper-less configuration, CMOS and RTC battery-less backup, Synchronous switching regulator, CPU thermal protection, CPU fan monitoring, System voltage monitoring, Over current protection, Modem Wake Up and Suspend to Hard Drive.

Jumper-less Design

Pentium II VID signal and SMBus clock generator provide CPU voltage auto-detection and allows user to set CPU frequency through CMOS setup, no jumper or switch is needed. The correct CPU information is saved into EEPROM, with these technologies, the disadvantages of Pentium base jumper-less design are eliminated. There will be no worry of wrong CPU voltage detection and no need to re-open the housing if CMOS battery loss. The only jumper left is to clear CMOS, which is a safety hook if you forget the password.

Battery-less Motherboard

AX6L implements EEPROM and special circuit (patent applied) that allows you to save your current CPU and CMOS Setup configurations without the need of battery. The RTC (real time clock) can also keep running as long as power cord is plugged. If you lose your CMOS data by accident, you can just reload the CMOS configurations from EEPROM and the system will recover as usual.

Overview

Suspend To Hard Drive

"Immediately" turns on system and goes back to the original screen before power down. You can resume your original work directly from hard disk without go through the Win95 booting process and run your application again. Suspend to Hard Drive saves your current work (system status, memory image) into hard disk. Note that you have to use VESA compatible PCI VGA, Sound Blaster compatible sound card with APM driver, for Suspend to Hard Drive to work properly.

Internal Modem Card Wake-up

In conjunction with ATX soft power On/Off, it is possible to have system totally power off and wakeup to automatically answer a phone call such as answering machine or to send/receive fax. The most important break through is not only external box modem but also internal modem card can be used to support Modem Wake Up. The AX6L and MP56 internal modem card implement special circuit (patent applied) to make sure the modem card work properly without any power.

RTC Wake Up Timer

The Wake Up Timer is more like an alarm, which wakes up and power on your system at a pre-defined time for specific application. It can be set to wake up everyday or on specific date within a month. The date/time accurate is second.

High Efficient Synchronous Switching Regulator

Most of the current switching designs are Asynchronous mode, which from the technical point of view, still consumes very high power as well as heat. AX6L implements high efficient synchronous switching design that the temperature of MOS FET is far less than Schottky diode of Asynchronous design.

Over Current Protection Circuit

The Over Current Protection was very popular implemented on the Baby AT or ATX 3.3V/5V/12V switching power supply. But unfortunately, the new generation Pentium II CPU uses different voltage that have regulator to transfer 5V to CPU voltage (for example, 2.8V), and make 5V over current protection useless. AX6L with switching regulator onboard support CPU over current protection, in conjunction with 3.3V/5V/12V power supply provide the full line over current protection.

Overview

CPU Thermal Protection

AX6L has a special thermal detection circuit to have warning through application software when the temperature is higher than a predefined value.

CPU and Housing Fan Monitoring

AX6L has one more "fan monitoring" function to prevent system overheat. There are two fan connectors, one is for CPU and the other can be a extra housing fan. The system will report and alarm fan malfunction though utility software such as HWMON2 (Small Icon for Hardware Monitoring).

System Voltage Monitoring

Further more, AX6L implements a voltage monitoring system, As you turn on your system, this smart design will continue to monitor your system working voltage. If any of the system voltage is over the component's standard. There will be alarm though utility software such as HWMON2 (Small Icon for Hardware Monitoring) for a warning to user.

FCC DoC certificate

AX6L has passed FCC DoC test. The radiation is very low, you can use any kind of housing.

Overview

1.1 Specifications

Form Factor	ATX
Board Size	305 mm x 244 mm
CPU	Intel Pentium II Processor
System Memory	3V EDO or SDRAM, 168-pin DIMM x4, maximum 1GB.
Second-level Cache	On the CPU card (Slot1 connector)
Chipset	Intel 82440LX
Expansion Slots	ISA x3, PCI x4 and AGP x1
Serial Port	Two serial ports UART 16C550 compatible, and the 3rd UART for IR function.
Parallel Port	One parallel port supports standard parallel port (SPP), enhanced parallel port (EPP) or extended capabilities port (ECP).
Floppy Interface	Floppy interface supports 3.5 inches drives with 720KB, 1.44MB or 2.88MB format or 5.25 inches drives with 360KB, 1.2MB format
IDE Interface	Dual-channel IDE interface support maximum 4 IDE hard disks or CDROM, mode 4 , bus master hard disk drives and Ultra DMA/33 mode hard drives are also supported.
USB Interface	Two USB ports supported by USB bracket, the BIOS also supports USB driver to simulate legacy keyboard.
PS/2 Mouse	Mini-Din PS/2 mouse connector onboard.
Keyboard	Mini-Din PS/2 keyboard connector onboard.
RTC and Battery	RTC within Intel PIIX4 chipset. Lithium (CR-2032) battery is an option, no battery is needed if power cord is plugged.
BIOS	AWARD Plug-and-Play, 2M bit Flash ROM BIOS

Overview

Suspend to Hard Drive	Supported by BIOS, save your work to hard disk and resume within a very short time. VESA compatible VGA and Sound Blaster compatible sound card required.
Modem Card Wake Up	Special circuit (patent applied) to support modem ring wake up by external box modem or internal AOpen MP56 modem card.
RTC Wake Up Timer	Program the date/time to wake up your system.
Synchronous Switching Regulator	High efficient synchronous switching regulator.
Over-current Protection	Full line (5V,12V,3.3V and CPU) over-current protection to prevent any accident short circuit.
CPU Thermal Protection	Warning when CPU temperature is overheat. Option for OEM to have sensor at CPU heatsink.
Fan Monitoring	Two fan connectors, warning when CPU or housing fan is malfunction.
System Voltage Monitoring	Warning when system voltage (5V,12V,3.3V and CPU core) are abnormal

Overview

1.2 Suspend to Hard Drive

Suspend to Hard Drive saves your current work (system status, memory and screen image) into hard disk, and then the system can be totally power off. Next time, when power is on, you can resume your original work directly from hard disk within few second without go through the Win95 booting process and run your application again. If your memory is 16MB, normally, you need to reserve at least 16MB HDD space to save your memory image. Note that you have to use VESA compatible PCI VGA (AOpen PV60/PT70), Sound Blaster compatible sound card and sound driver that supports APM (AOpen AW32/AW35) for Suspend to Hard Drive to work properly. Of course, we recommend to use AOpen products for best compatibility.

To use Suspend to Hard Drive:

1. Go into BIOS setup, Power Management → Suspend Mode Option, select "Suspend to Disk".
2. Go into BIOS setup, PNP/PCI Configuration → PnP OS Installed, select "No". This can give BIOS the capability to allocate system resources for Suspend to Hard Drive.
3. Bootup your system into DOS command prompt. If you are Win'95 user, Please restart your Windows 95 under "Command Prompt" by pressing "F8" while system shows "Windows 95 Starting ...". Choose "Safe Mode Command Prompt Only" from selection so that system will start in DOS command prompt.
4. Copy AOZVHDD.EXE to the root directory of your C: drive.
5. Option 1: Use **/file** switch (applied to FAT16 file system):
Please use following command to create a hidden file in the root directory of your hard disk for Suspend to Hard Drive to save the system status and memory image.

C:>AOZVHDD /c /file

Please make sure that you have enough continuous HDD space for creating this hidden file. For example, if you have 32MB of system memory and 4MB of VGA memory, you need at least 36MB (32MB + 4MB) of continuous HDD space. If AOZVHDD failed to allocate the HDD space, you may run "DEFRAG" Utility or "Disk Defragmenter" which come with MS-DOS or Win'95 to free HDD space.

Overview

Option2: Use **/partition** switch (applied to FAT16/FAT32 file system):

To create a separate partition for Suspend to Hard Drive, please make sure you have reserved a free partition. We suggest you reserve the free partition which space is appropriate for your future memory expansion. For example, if you have 32MB of system memory and 4MB of VGA memory currently, but you plan to upgrade system memory to 64MB in the near future, then you may reserve a 68MB (64MB+4MB) space by using a disk utility (such as fdisk). Next, use following command to create a suspend partition:

```
C:>AOZVHDD /c /partition
```

If there is no extra free partition and you don't want your data lost, please do not use this partition method.

6. After creating above partition or hidden file, please reboot your system.
7. Push suspend switch (momentary mode) or use Win95 Suspend icon to force system goes into Suspend to Hard Drive mode and then turn system power off by power switch of your power supply.
8. Next time when you turn on your system, it will resume to your original work automatically.



Warning: Note that Intel Bus Master and Ultra DMA/33 IDE driver are not fully compatible with Suspend to Hard Drive function, installing these drivers may cause the system unstable. Under this situation, please uninstall the drivers.

Overview



Tip: Following VGA card have been tested & recognized as VESA compatible VGA device.

AOpen PV90 (Trident 9680)

AOpen PT60 (S3 Virge/BIOS R1.00-01)

AOpen PV60 (S3 Tiro64V+)

AOpen PT70 (S3 Virge/DX)

ProLink Trident GD-5440

ProLink Cirrus GD-5430

ProLink Cirrus GD-5446

ATI Mach 64 GX

ATI 3D RAGE II

Diamond Stealth64D (S3 868)

Diamond Stealth64V (S3 968)

KuoWei ET-6000.



Tip: Following Sound card have been tested OK for Suspend to Hard Drive.

AOpen AW32

AOpen AW35

AOpen MP32

Creative SB 16 Value PnP

Creative SB AWE32 PnP

ESS 1868 PnP

If your sound card can not work after resume from Suspend to Hard Drive, check your sound card vendor see if there is driver to support APM, and install it again.



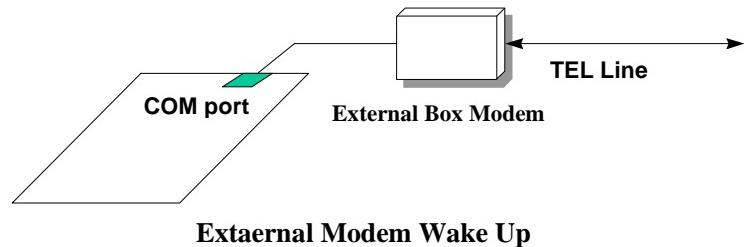
Note: The USB function has not been tested for Suspend to Hard Drive. If you find any unstable problem, please go into BIOS, Integrated Peripherals à USB Legacy Support. Disable the USB Legacy function.

Overview

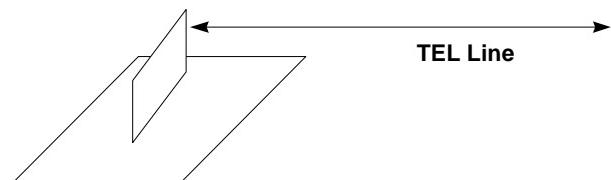
1.3 Modem Wake Up

The Modem Wake Up discussed here is to wakeup from true power off (identified by fan of power supply is off), This motherboard still supports traditional green PC suspend mode but it is not discussed here.

With the help ATX soft power On/Off, it is possible to have system totally power off (The traditional suspend mode of power management function does not really turn off the system power supply), and wakeup to automatically answer a phone call such as answering machine or to send/receive fax. You may identify the true power off by checking fan of your power supply. Both external box modem and internal modem card can be used to support Modem Wake Up, but if you use external modem, you have to keep the box modem always power-on. AOpen AX6L and internal modem card implement special circuit (patent applied) and make sure the modem card works properly without any power. We recommend you choose AOpen modem card (MP56) for Modem Wake Up applications.



Extaernal Modem Wake Up



Internal Modem Card Wake Up (such as MP56)

Overview

For Internal Modem Card (AOpen MP56):

1. Go into BIOS setup , Power Management → Modem Wake Up, select Enable.
2. Setup your application, put into Windows 95 StartUp or use Suspend to Hard Drive function.
3. Turn system power off by soft power switch.
4. Connect 4-pin Modem Ring-On cable from MP56 RING connector to AX6L connector WKUP.
5. Connect telephone line to MP56. You are now ready to use Modem Ring-On.

For External Box Modem:

1. Go into BIOS setup , Power Management → Modem Wake Up, select Enable.
2. Setup your application, put into Windows 95 StartUp or use Suspend to Hard Drive function.
3. Turn system power off by soft power switch.
4. Connect RS232 cable of external box Modem to COM1 or COM2.
4. Connect telephone line to external box Modem. Turn on Modem power (you must keep Modem power always on). You are now ready to use Modem Ring



Tip: External modem wake up signal is detected through COM1 or COM2. Internal modem card wake up signal is detected through cable from connector RING (on modem card) to WKUP (on mainboard).



Tip: You can combine Suspend to Hard Drive, Modem Wake Up and the software Acephone for the best solution of answering machine or to send/receive fax.

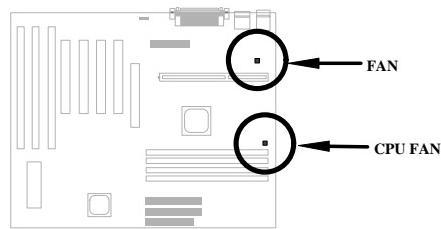
Note: If you use external modem, the power of external modem must be kept on to receive signal from telephone line. Internal modem card has no such limitation.

Overview

1.4 System Voltage Monitoring

AX6L implements a voltage monitoring system. As you turn on your system, this smart design will continue to monitor your system working voltage. If any of the system voltage is over the component's standard. There will be alarm through application software such as HWMON2 (Small Icon for Hardware Monitoring) for a warning to user. System voltage monitoring function monitors 5V, 12V, 3.3V and CPU core voltage. It is automatically implemented by BIOS and HWMON2, no hardware installation is needed.

1.5 Fan Monitoring



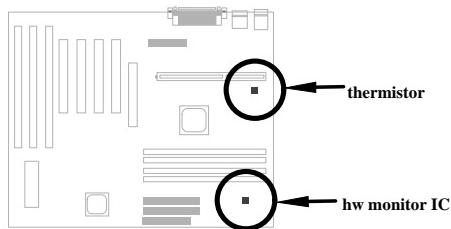
There are two fan connectors, one is for CPU, the other can be a housing fan. The fan monitoring function is implemented by connecting fan to 3-pin fan connector **CPUFAN** or **FAN** and installing HWMON2 (Small Icon for Hardware Monitoring).



Note: You need 3-pin fan that supports SENSE signal for fan monitoring function to work properly.

Overview

1.6 CPU Thermal Protection

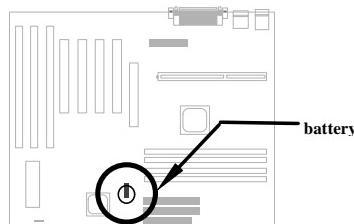


This mainboard implements special thermal protection circuits. When temperature is higher than a predefined value, there will be warning through application software such as HWMON2 (Small Icon for Hardware Monitoring) to notify user. It is automatically implemented by BIOS and HWMON2, no hardware installation is needed.

For OEM customer who needs more accurate temperature, AX6L reserves an option to use special CPU heatsink with thermal sensor on it. The CPU thermal sensor should be connected to **CN3**.

Overview

1.7 Battery-less Design



To preserve the earth, AOpen AX6L implements the world first battery-less motherboard design. There is no need to have battery for RTC (real time clock) and CMOS Setup as long as ATX power cable is plugged. In case of the AC power is shutdown or power cord is removed by accident, the CMOS Setup and system configuration can be restored from EEPROM, only the system clock needed to be re-set to current date/time.

For the convenience of end user, AX6L still shipped with one Lithium (CR-2032) battery. If you prefer to use battery, you can still Insert it into battery socket. The RTC will still keep running even power cord is removed.

Chapter 2

Hardware Installation

This chapter gives you a step-by-step procedure on how to install your system. Follow each section accordingly.



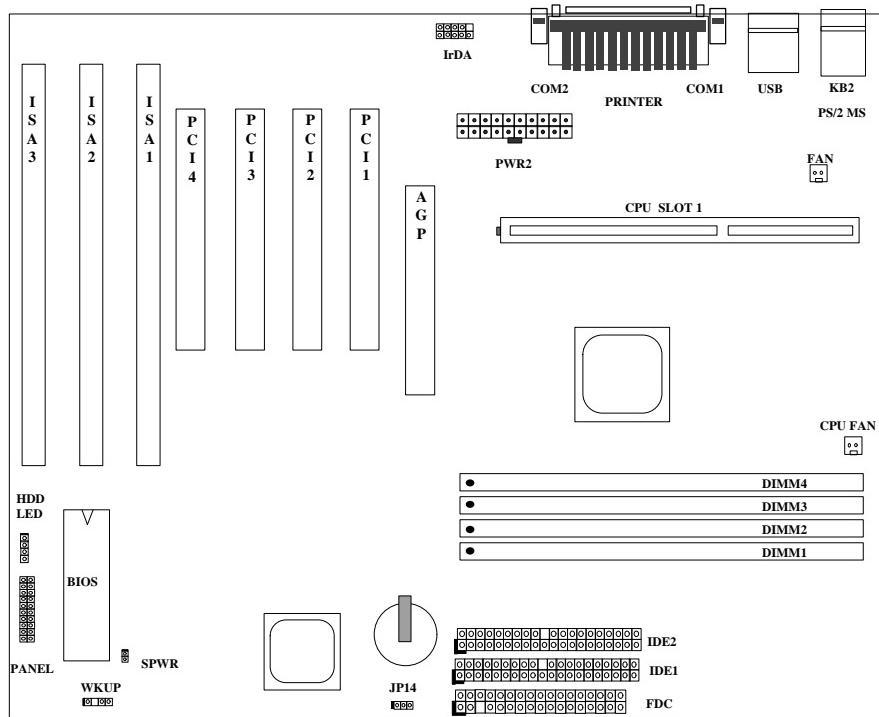
Caution: Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.

1. Do not remove a component from its protective packaging until you are ready to install it.
2. Wear a wrist ground strap and attach it to a metal part of the system unit before handling a component. If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.

Hardware Installation

2.1 Jumper and Connector Locations

The following figure shows the locations of the jumpers and connectors on the system board:



Jumpers:

JP14: Clear CMOS

Connectors:

PS2 MS: PS/2 mouse connector
KB2: PS/2 keyboard connector
COM1: COM1 connector

Hardware Installation

<i>COM2:</i>	<i>COM2 connector</i>
<i>PRINTER:</i>	<i>Printer connector</i>
<i>PWR2:</i>	<i>ATX power connector</i>
<i>USB:</i>	<i>USB connector</i>
<i>FDC:</i>	<i>Floppy drive connector</i>
<i>IDE1:</i>	<i>IDE1 primary channel</i>
<i>IDE2:</i>	<i>IDE2 secondary channel</i>
<i>CPU FAN:</i>	<i>CPU Fan connector</i>
<i>FAN:</i>	<i>Fan connector</i>
<i>IrDA:</i>	<i>IrDA (Infrared) connector</i>
<i>HDD LED:</i>	<i>HDD LED connector</i>
<i>PANEL:</i>	<i>Front panel (Multifunction) connector</i>
<i>SPWR:</i>	<i>ATX Soft-Power Switch Connector</i>
<i>WKUP:</i>	<i>Wake Up Connector</i>

Hardware Installation

2.2 Jumpers

With the help of Pentium II VID signal and SMBus, this motherboard is jumper-less design. The only jumper left is to clear CMOS, which is a safety hook if you forget the password.

2.2.1 Selecting the CPU Frequency

Pentium II VID signal and SMBus clock generator provide CPU voltage auto-detection and allow user to set CPU frequency through CMOS setup, no jumper or switch is needed. The correct CPU information is saved into EEPROM, with these technologies, the disadvantages of Pentium base jumper-less design are eliminated. There will be no worry of wrong CPU voltage detection and no need to re-open the housing if CMOS battery loss.

The CPU frequency selection is set by going into:

BOIS Setup à Chipset Features Setup à CPU Clock Frequency
(The possible setting is 66, 68.5, 75 and 83.3 MHz)

BOIS Setup à Chipset Features Setup à CPU Clock Ratio
(The possible setting is 1.5x, 2x, 2.5x, 3x, 3.5x, 4x, 4.5x, 5x, 5.5x, 6x, 6.5x, 7x, 7.5x, and 8x)

Core frequency = Ratio * External bus clock

INTEL Pentium II	CPU Core Frequency	Ratio	External Bus Clock
Klamath 233	233MHz =	3.5x	66MHz
Klamath 266	266MHz =	4x	66MHz
Klamath 300	300MHz =	4.5x	66MHz
Klamath 333	333MHz =	5x	66MHz



Warning: The possible settings of current CPU available on the market are listed above, the default setting is Pentium II 233mhz. The other settings are only for internal test, which may cause serious system damage.

Hardware Installation

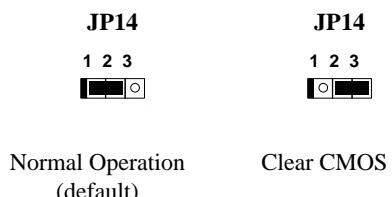
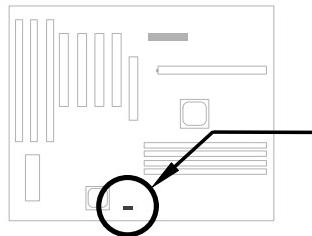
2.2.2 Setting the CPU Voltage

This motherboard supports Pentium II (Klamath) VID function, the CPU core voltage is automatically detected, the range is from 1.3V to 3.5V.

2.2.3 Clearing the CMOS

JP14	Clear CMOS
1-2	Normal operation (default)
2-3	Clear CMOS

You need to clear the CMOS if you forget your system password. To clear the CMOS, follow the procedures listed below:



The procedure to clear CMOS:

1. Turn off the system power.
2. Remove ATX power cable from connector PWR2.
3. Locate **JP14** and short pins 2-3 for a few seconds.
4. Return **JP14** to its normal setting by shorting pins 1-2.
5. Connect ATX power cable back to connector PWR2.
6. Turn on the system power.
7. Press **[DEL]** during bootup to enter the BIOS Setup Utility and specify a new password, if needed.

Tip: If your system hangs or fails to boot because of over-clocking, please clear CMOS and the system will go back to default setting. Except using JP14, you can also press <Home> key to clear CMOS while system booting.



Hardware Installation

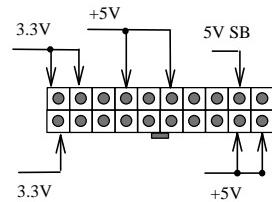
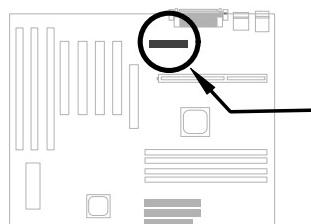
2.3 Connectors

2.3.1 Power Cable

The ATX power supply uses 20-pin connector shown below. Make sure you plug in the right direction.



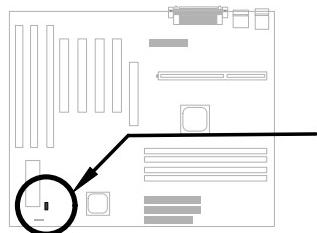
Caution: Make sure that the power supply is off before connecting or disconnecting the power cable.



PWR2

2.3.2 ATX Soft-Power Switch Connector

The ATX soft-power switch connector is a 2-pin header on the system board. Locate the power switch cable from your ATX housing. It is 2-pin female connector from the housing front panel. Plug this connector to the soft-power switch connector marked **SPWR**.

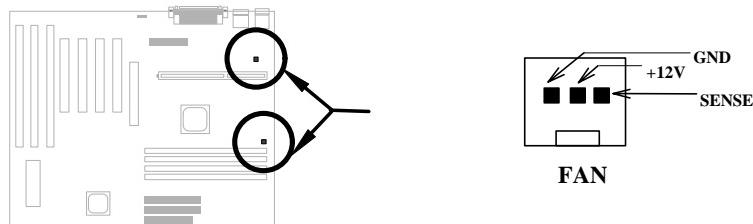


SPWR

Hardware Installation

2.3.3 Fan

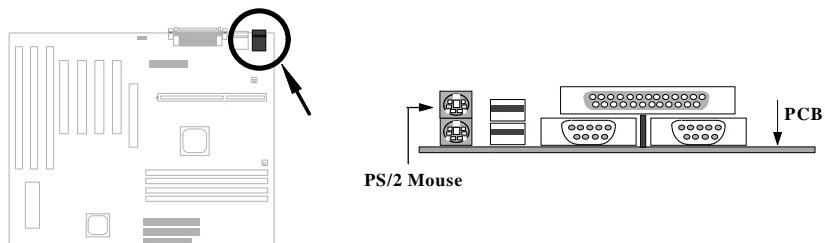
Plug in the fan cable to the 3-pin fan connector onboard. The fan connector is marked **CPU FAN** and **FAN** on the system board.



Note: Attach fan cable to either CPU FAN connector or FAN connector. Both of these two fans connectors can support hardware monitoring function, however, you can only use the CPU FAN connector to control the fan power ON/OFF.

2.3.4 PS/2 Mouse

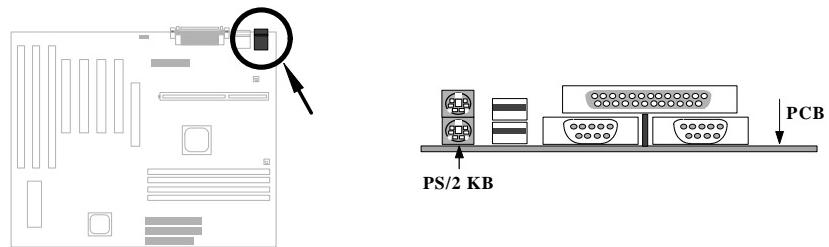
The onboard PS/2 mouse connector is a 6-pin Mini-Din connector marked **PS2 MS**. The view angle of drawing shown here is from back panel of the housing.



Hardware Installation

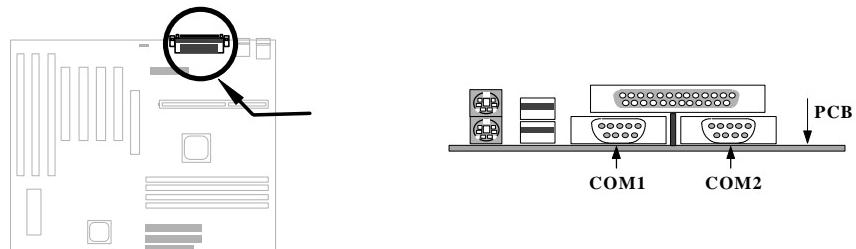
2.3.5 Keyboard

The onboard PS/2 keyboard connector is a 6-pin Mini-Din connector marked **KB2**. The view angle of drawing shown here is from back panel of the housing.



2.3.6 Serial Devices (COM1/COM2)

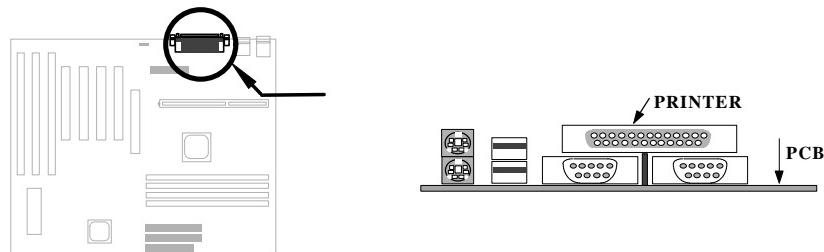
The onboard serial connectors are 9-pin D-type connector on the back panel of mainboard. The serial port 1 connector is marked as **COM1** and the serial port 2 connector is marked as **COM2**.



Hardware Installation

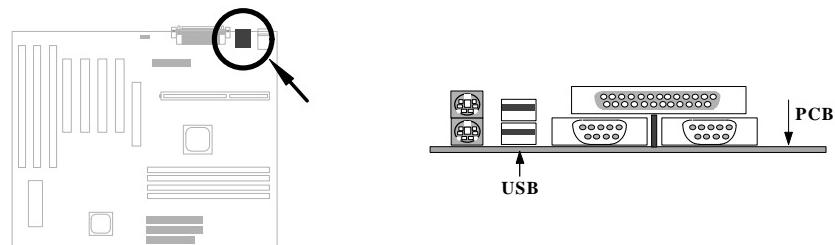
2.3.7 Printer

The onboard printer connector is a 25-pin D-type connector marked **PRINTER**.
The view angle of drawing shown here is from back panel of the housing.



2.3.8 USB Device

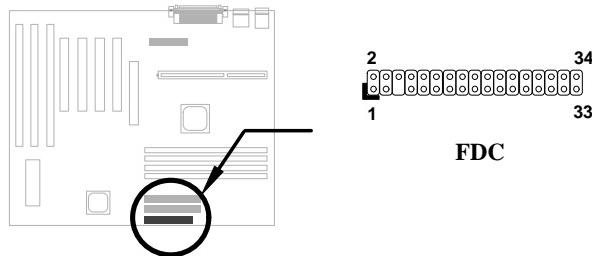
You can attach USB devices to the USB connector. The mothermoard contains two USB connectors, which are marked as **USB**.



Hardware Installation

2.3.9 Floppy Drive

Connect the 34-pin floppy drive cable to the floppy drive connector marked as **FDC** on the system board.

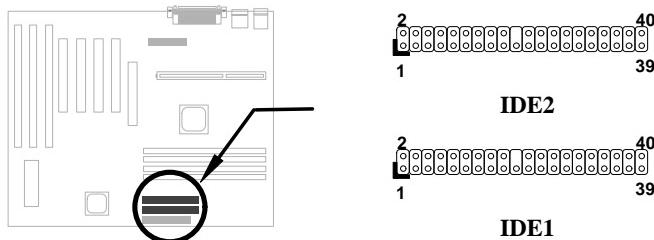


2.3.10 IDE Hard Disk and CD ROM

This mainboard supports two 40 pin IDE connectors marked as **IDE1** and **IDE2**. IDE1 is also known as primary channel and IDE2 as secondary channel, each channel supports two IDE devices that makes total of four devices.

In order to work together, the two devices on each channel must be set differently to master and slave mode, either one can be hard disk or CDROM. The setting as master or slave mode depends on the jumper on your IDE device, please refer to your hard disk and CDROM manual accordingly.

Connect your first IDE hard disk to master mode of the primary channel. If you have second IDE device to install in your system, connect it as slave mode on the same channel, and the third and fourth device can be connected on secondary channel as master and slave mode respectively.

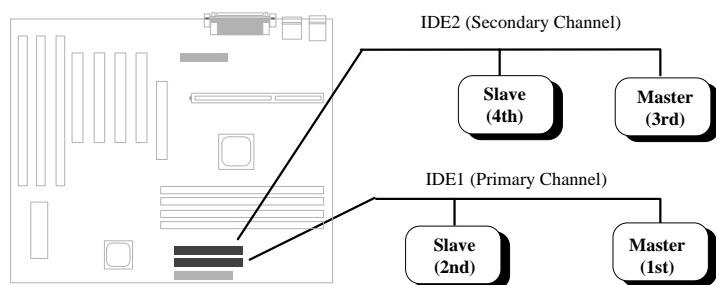


Hardware Installation



Caution: The specification of IDE cable is maximum 46cm (18 inches), make sure your cable does not excess this length.

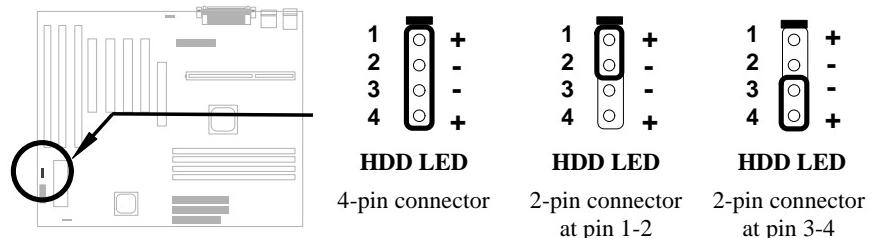
Caution: For better signal quality, it is recommended to set far end side device to master mode and follow the suggested sequence to install your new device . Please refer to following figure.



2.3.11 Hard Disk LED

The HDD LED connector is marked as **HDD LED** on the board. This connector is designed for different type of housing, actually only two pins are necessary for the LED. If your housing has four pin connector, simply plug it in. If you have only two pin connector, please connect to pin 1-2 or pin 3-4 according to the polarity.

Pin	Description
1	HDD LED
2	GND
3	GND
4	HDD LED



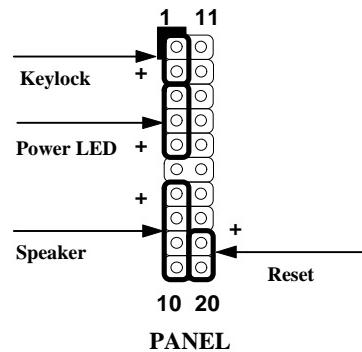
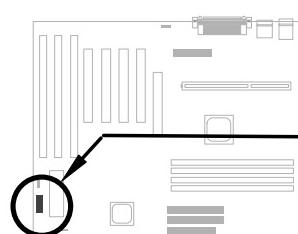
Hardware Installation

2.3.12 Panel Connector

The Panel (multifunction) connector is a 20-pin connector marked as **PANEL** on the board. Attach the power LED, keylock, speaker, and reset switch to the corresponding pins as shown in the figure.

Some housings have a five-pin connector for the keylock and power LED. Since power LED and keylock are aligned together, you can still use this kind of connector.

	1	11
GND		+5V
KEYLOCK		GND
GND		Reserved
RESET		GND
POWER LED		NC
SPEAKER		NC
+5V		GND
GND		NC
NC		RESET
SPEAKER		GND
	10	20
	PANEL	



Other housings may have a 12-pin connector. If your housing has this type of connector, connect it to PANEL as shown in the figure. Make sure that the red wire of the connector is connected to +5V.

Hardware Installation



Note: If your housing comes with Turbo switch and Turbo LED connectors, you may use these connectors for Suspend switch and Green mode LED functions, respectively.

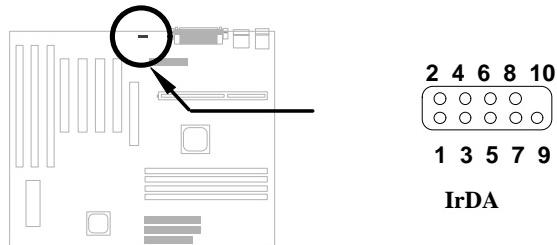
Note: Pressing the Suspend switch allows you to manually force the system to suspend mode. However, this is possible only if the Power Management function in the BIOS Setup menu is enabled.

2.3.13 IrDA Connector

The IrDA connector can be configured to support wireless infrared module, with this module and application software such as Laplink or Win95 Direct Cable Connection, user can transfer files to or from laptops, notebooks, PDA and printers. This connector supports HPSIR (115.2Kbps, 2 meters), ASK-IR (56Kbps), Fast IR (4Mbps, 2 meters) and Consumer IR.

Install infrared module onto IrDA connector and enable infrared function from BIOS setup, make sure to have correct orientation when you plug onto IrDA connector.

Pin	Description
1	+5V
3	FIRRX (FAST IR)
4	CIRRX (Consumer IR)
5	IRRX (STANDARD IR)
6	5VSB
7	GND
9	IRTX (STANDARD IR)



Hardware Installation

2.3.14 Wake-up Connector

This mainboard implements special circuit to support Modem Ring-On, both Internal Modem Card (AOpen MP56) and external box Modem are supported. Since Internal Modem card consumes no power when system power is off, it is recommended to use Internal Modem. To use AOpen MP56, connect 4-pin cable from **RING** connector of MP56 to **WKUP** connector on the mainboard.

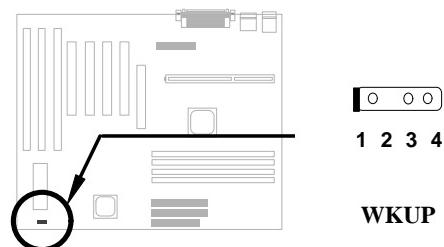
Pin	Description
1	+5V SB
2	NC
3	RING
4	GND



Note: Wake-Up Connector and Modem Ring-On are patent applied.

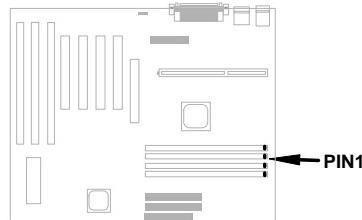


Tip: Not only for Modem Ring-On, there are many other possible applications. For example, IR wakeup or voice wakeup.



Hardware Installation

2.4 Configuring the System Memory



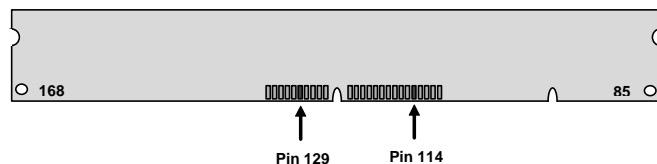
The DIMM types supported are EDO (Extended Data Out) and SDRAM (Synchronous DRAM). This mainboard has four 168 pin DIMM sockets (Dual-in-line Memory Module) that allow you to install system memory up to 1GB.

DIMM modules can be identified by following factors:

- I. **Size:** single side, 1Mx64 (8MB), 2Mx64 (16MB), 4Mx64 (32MB), 8Mx64 (64MB), 16Mx64 (128MB), and double side, 1Mx64x2 (16MB), 2Mx64x2 (32MB), 4Mx64x2 (64MB), 8Mx64x2 (128MB).



Tip: Here is a trick to check if your DIMM is single-side or double-side -- if there are traces connected to golden finger pin 114 and pin 129 of the DIMM, the DIMM is probably double-side; otherwise, it is single-side. Following figure is for your reference.



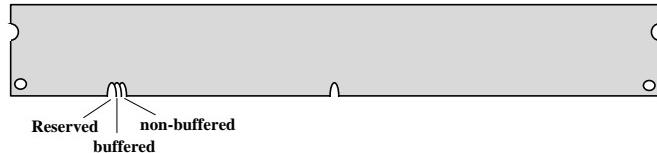
- II. **Speed:**

SDRAM: normally marked as -12, which means the clock cycle time is 12ns and maximum clock of this SDRAM is 83MHz. Sometimes you can also find the SDRAM marked as -67, which means maximum clock is 67MHz.

EDO: the access time of EDO RAM can be 60ns or 70ns.

Hardware Installation

III. Buffered and non-buffered: This motherboard supports non-buffered DIMMs. You can identify non-buffered DIMMs and buffered DIMMs according to the position of the notch, following figure is for your reference:



Because the positions are different, only non-buffered DIMMs can be inserted into the DIMM sockets on this motherboard. Although most of DIMMs on current market are non-buffered, we still recommend you to ask your dealer for the correct type.

IV. 2-clock and 4-clock signals: Although both of 2-clock and 4-clock signals are supported by AX6L, we strongly recommend you to choose 4-clock SDRAM in consideration of reliability.



***Tip:** To identify 2-clock and 4-clock SDRAM, you may check if there are traces connected to golden finger pin 79 and pin 163 of the SDRAM. If there are traces, the SDRAM is probably 4-clock; Otherwise, it is 2-clock.*

V. Parity: This motherboard supports standard 64 bit wide (without parity) and 72-bit wide (with parity) DIMM modules.

There is no jumper setting required for the memory size or type. It is automatically detected by the system BIOS, and the total memory size is to add them together. **The maximum is 1GB.**

LX chipset can only use 3V EDO or SDRAM, so we can mix EDO and SDRAM without any problem.

Every DIMM socket can be EDO or SDRAM. For EDO, maximum is 256MB. For SDRAM, maximum is 128MB.

Total Memory Size = Size of DIMM1 + Size of DIMM2 + Size of DIMM3 + Size of DIMM4



Note: 1GB memory is achieved by using double-sided buffered EDO DIMMs.

Following table list the recommended SDRAM combinations:

Hardware Installation

DIMM Data chip	Bit size per side	Single/Double side	Chip count	DIMM size
1M by 16	1Mx64	x1	4	8MB
1M by 16	1Mx64	x2	8	16MB
2M by 8	2Mx64	x1	8	16MB
2M by 8	2Mx64	x2	16	32MB
4M by 4	4Mx64	x1	16	32MB
16M by 4	16Mx64	x1	16	128MB
2M by 32	2Mx64	x1	2	16MB
2M by 32	2Mx64	x2	4	32MB
4M by 16	4Mx64	x1	4	32MB
4M by 16	4Mx64	x2	8	64MB
8M by 8	8Mx64	x1	8	64MB
8M by 8	8Mx64	x2	16	128MB

Following table list the recommended EDO DRAM combinations:

DIMM Data chip	Bit size per side	Single/Double side	Chip count	DIMM size
1M by 4	1Mx64	x1	16	8MB
1M by 4	1Mx64	x2	32	16MB
1M by 16	1Mx64	x1	4	8MB
1M by 16	1Mx64	x2	8	16MB
2M by 8	2Mx64	x1	8	16MB
2M by 8	2Mx64	x2	16	32MB
4M by 4	4Mx64	x1	16	32MB
4M by 4	4Mx64	x2	32	64MB
16M by 4	16Mx64	x1	16	128MB
16M by 4	16Mx64	x2	32	256MB
2M by 32	2Mx64	x1	2	16MB
2M by 32	2Mx64	x2	4	32MB
4M by 16	4Mx64	x1	4	32MB
4M by 16	4Mx64	x2	8	64MB
8M by 8	8Mx64	x1	8	64MB
8M by 8	8Mx64	x2	16	128MB

The EDO and SDRAM that AOpen had tested are listed below.

Size/Type	Vendor	Model	Single/Double	Chip Count

Hardware Installation

Size/Type	Vendor	Model	Single/Double	Chip Count
8M/EDO	Micron	MT4LCM16E5TG6	x1	8
16M/EDO	Micron	MT4LC2M8E7DJ-6	x1	4
16M/EDO	Hitachi	51W17805BJ6	x1	8
32M/EDO	Hitachi	51W17405BLTS6	x1	16
64M/EDO	Hyundai	HY51V65804 TC-60	x1	8
8M/SDRAM	SEC	KM416511220AT-G12	x1	4
8M/SDRAM	TI	TMS626162DGE M-67	x1	4
8M/SDRAM	TI	TMS626162DGE-15	x1	4
16M/SDRAM	TI	TMS626162DGE-15	x2	8
16M/SDRAM	TI	TMS626812DGE-15	x1	8
16M/SDRAM	NEC	D4516821G5-A12-7JF	x1	8
16M/SDRAM	Toshiba	TC59S1608AFT-12A	x1	8
16M/SDRAM	TI	TMS626812DGE-12A	x1	8
16M/SDRAM	TI	TMS626812DGE-12A	x1	8
16M/SDRAM	LGS	GM72V16821BT10K	x1	8
32M/SDRAM	Toshiba	TC59S1608AFT-12A	x2	16
32M/SDRAM	NEC	D4516821G5-A10-7JF	x2	16
128M/SDRAM	NEC	D4564841G5-A10-9JF	x2	16
16M/SDRAM	IBM	0316169CT3B	x2	8
16M/SDRAM	Hitachi	HM5216165TT10	x1	8
16M/SDRAM	IBM	0316809CT4B	x1	8

Memory error checking is supported by parity check. To use parity check you need 72 bit DIMM (64+8 bit parity), which are automatically detected by BIOS.

Hardware Installation



Warning: The driving capability of new generation chipset is limited because the lack of memory buffer (to improve performance). This makes DRAM chip count an important factor to be taking into consideration when you install DIMM. Unfortunately, there is no way that BIOS can identify the correct chip count, you need to calculate the chip count by yourself. The simple rule is: By visual inspection, use only DIMM which is less than 16 chips.



Tip: The parity mode uses 1 parity bit for each byte, normally it is even parity mode, that is, each time the memory data is updated, parity bit will be adjusted to have even count "1" for each byte. When next time, if memory is read with odd number of "1", the parity error is occurred and this is called single bit error detection.

Chapter 3

Award BIOS

This chapter tells how to configure the system parameters. You may update your BIOS via AWARD Flash Utility.



Important: Because the BIOS code is the most often changed part of the mainboard design, the BIOS information contained in this chapter (especially the Chipset Setup parameters) may be a little different compared to the actual BIOS that came with your mainboard.

3.1 Entering the Award BIOS Setup Menu

The BIOS setup utility is a segment of codes/routines residing in the BIOS Flash ROM. This routine allows you to configure the system parameters and save the configuration into the 128 byte CMOS area, (normally in the RTC chip or directly in the main chipset). To enter the BIOS Setup, press **DEL** during POST (Power-On Self Test). The BIOS Setup Main Menu appears as follows.

AWARD BIOS

ROM PCI/ISA BIOS (XXXXXXXX)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	PASSWORD SETTING
CHIPSET FEATURES SETUP	IDE HDD AUTO DETECTION
POWER MANAGEMENT SETUP	SAVE & EXIT SETUP
PNP/PCI CONFIGURATION SETUP	EXIT WITHOUT SAVING
LOAD SETUP DEFAULTS	LOAD EEPROM DEFAULT
LOAD TURBO DEFAULTS	SAVE EEPROM DEFAULT
ESC : Quit	á à à ß : Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color
Description of each function	



Tip: Choose "Load Setup Defaults" for recommended optimal performance. Choose "Load Turbo Defaults" for best performance with light system loading. Refer to section 3.7.

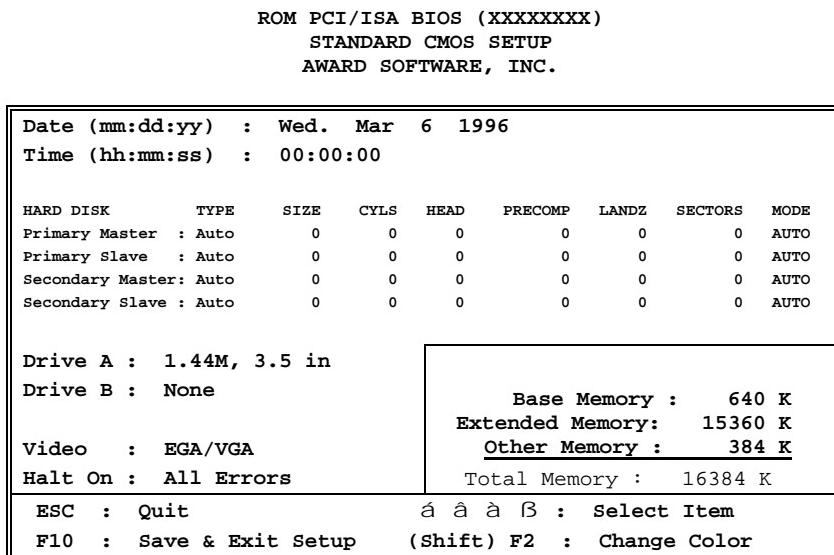
The section at the bottom of the screen tells how to control the screen. Use the arrow keys to move between items, [SHIFT] [F2] to color scheme of the display, [ESC] to exit, and [F10] to save the changes before exit. Another section at the bottom of the screen displays a brief description of the highlighted item.

After selecting an item, press [ENTER] to select or enter a submenu.

AWARD BIOS

3.2 Standard CMOS Setup

The "Standard CMOS Setup" sets the basic system parameters such as the date, time, and the hard disk type. Use the arrow keys to highlight an item and **[PGUP]** or **[PGDN]** to select the value for each item.



Standard CMOS à Date

To set the date, highlight the Date parameter. Press **[PGUP]** or **[PGDN]** to set the current date. The date format is month, date, and year.

Standard CMOS à Time

To set the time, highlight the Time parameter. Press **[PGUP]** or **[PGDN]** to set the current time in hour, minute, and second format. The time is based on the 24 hour military clock.

AWARD BIOS

Standard CMOS à Primary Master à Type

Standard CMOS à Primary Slave à Type

Standard CMOS à Secondary Master à Type

Standard CMOS à Secondary Slave à Type

Type

Auto

User

None

1

2

...

45

This item lets you select the IDE hard disk parameters that your system supports. These parameters are Size, Number of Cylinder, Number of Head, Start Cylinder for Pre-compensation, Cylinder number of Head Landing Zone and Number of Sector per Track. The default setting is **Auto**, which enables BIOS to automatically detect the parameters of installed HDD at POST (Power-On Self Test). If you prefer to enter HDD parameters manually, select User. Select None if no HDD is connected to the system.

The IDE CDROM is always automatically detected.



Tip: For an IDE hard disk, we recommend that you use the "IDE HDD Auto Detection" to enter the drive specifications automatically. See the section "IDE HDD Auto Detection".

Standard CMOS à Primary Master à Mode

Standard CMOS à Primary Slave à Mode

Standard CMOS à Secondary Master à Mode

Standard CMOS à Secondary Slave à Mode

Mode

Auto

Normal

LBA

Large

The enhanced IDE feature allows the system to use a hard disk with a capacity of more than 528MB. This is made possible through the Logical Block Address (LBA) mode translation. The LBA is now considered as a standard feature of current IDE hard disk on the market because of its capability to support capacity larger than 528MB. Note that if HDD is formatted with LBA On, it will not be able to boot with LBA Off.

AWARD BIOS

Standard CMOS à Drive A

Standard CMOS à Drive B

Drive A

None
360KB 5.25"
1.2MB 5.25"
720KB 3.5"
1.44MB 3.5"
2.88MB 3.5"

These items select floppy drive type. The available settings and types supported by the mainboard are listed on the left.

Standard CMOS à Video

Video

EGA/VGA
CGA40
CGA80
Mono

This item specifies the type of video card in use. The default setting is VGA/EGA. Since current PCs use VGA only, this function is almost useless and may be disregarded in the future.

Standard CMOS à Halt On

Halt On

No Errors
All Errors
All, But Keyboard
All, But Diskette
All, But Disk/Key

This parameter enables you to control the system stops in case of Power-On Self Test (POST) error.

AWARD BIOS

3.3 BIOS Features Setup

This screen appears when you select the option "BIOS Features Setup" from the main menu.

ROM PCI/ISA BIOS (XXXXXXXX)	
BIOS FEATURES SETUP	
AWARD SOFTWARE, INC.	
Virus Warning	: Disabled
External Cache	: Enabled
Quick Power On Self Test	: Enabled
Boot Sequence	: A,C,SCSI
Swap Floppy Drive	: Disabled
Boot Up NumLock Status	: ON
Boot Up System Speed	: High
TypeMatic Rate Setting	: Disabled
TypeMatic Rate (Chars/Sec)	: 6
TypeMatic Delay (Msec)	: 250
Security Option	: Setup
PCI/VGA Palette Snoop	: Disabled
OS Select for DRAM > 64MB	: Non-OS/2
Video BIOS Shadow	: Enabled
C8000-CBFFFF Shadow	: Disabled
CC000-CFFFF Shadow	: Disabled
D0000-D3FFFF Shadow	: Disabled
D4000-D7FFFF Shadow	: Disabled
D8000-DBFFFF Shadow	: Disabled
DC000-DFFFFFF Shadow	: Disabled
ESC: Quit	á á à ß : Select Item
F1 : Help	PU/PD/+/- : Modify
F5 : Old Values	(Shift) F2 : Color
F6 : Load Setup Defaults	
F7 : Load Turbo Defaults	

BIOS Features à Virus Warning

<u>Virus Warning</u>	Set this parameter to Enabled to activate the warning message. This feature protects the boot sector and partition table of your hard disk from virus intrusion.
Enabled	
Disabled	Any attempt during boot up to write to the boot sector of the hard disk drive stops the system and the following warning message appears on the screen. Run an anti-virus program to locate the problem.

! WARNING !

Disk Boot Sector is to be modified

Type "Y" to accept write, or "N" to abort write

Award Software, Inc.

AWARD BIOS

BIOS Features à External Cache

External Cache

Enabled
Disabled

Enabling this parameter activates the secondary cache (currently, PBSRAM cache). Disabling the parameter slows down the system. Therefore, we recommend that you leave it enabled unless you are troubleshooting a problem.

BIOS Features à Power-On Self-Test

Quick Power-on Self-test

Enable
Disabled

This parameter speeds up POST by skipping some items that are normally checked.

BIOS Features à Boot Sequence

Boot Sequence

A,C,SCSI
C,A,SCSI
C,CDROM,A
CDROM,C,A
D,A,SCSI
E,A,SCSI
F,A,SCSI
SCSI,A,C
SCSI,C,A
C only
LS/ZIP,C

This parameter allows you to specify the system boot up search sequence. The hard disk ID are listed below:
C: Primary master
D: Primary slave
E: Secondary master
F: Secondary slave
LS: LS120
Zip: IOMEGA ZIP Drive

BIOS Features à Swap Floppy Drive

Swap Floppy Drive

Enabled
Disabled

This item allows you to swap floppy drives. For example, if you have two floppy drives (A and B), you can assign the first drive as drive B and the second drive as drive A or vice-versa.

BIOS Features à Boot-up NumLock Status

AWARD BIOS

Boot-up NumLock

Status

On

Off

Setting this parameter to On enables the numeric function of the numeric keypad. Set this parameter to Off to disregard the function. Disabling the numeric function allows you to use the numeric keypad for cursor control.

BIOS Features à Boot-up System Speed

Boot-up System

Speed

High

Low

Select High or Low system speed after boot.

BIOS Features à Typematic Rate Setting

Typematic Rate

Setting

Enabled

Disabled

Set this parameter to Enable/Disable the keyboard repeat function. When enabled, continually holding down a key on the keyboard will generate repeatedly keystrokes.

BIOS Features à Typematic Rate

Typematic Rate

6

8

10

12

15

20

24

30

This item allows you to control the speed of repeated keystrokes. The default is 30 characters/sec.

AWARD BIOS

BIOS Features à Typematic Delay

Typematic Delay

250
500
750
1000

This parameter allows you to control the delay time between the first and the second keystroke (where the repeated keystrokes begin). The typematic delay settings are 250, 500, 750, and 1000 msec.

BIOS Features à Security Option

Security Option

Setup
System

The **System** option limits access to both the System boot and BIOS setup. A prompt asking you to enter your password appears on the screen every time you boot the system.

The **Setup** option limits access only to BIOS setup.

To disable the security option, select Password Setting from the main menu, don't type anything and just press <Enter>.

BIOS Features à PCI/VGA Palette Snoop

PCI/VGA Palette Snoop

Enabled
Disabled

Enabling this item informs the PCI VGA card to keep silent (and to prevent conflict) when palette register is updated (i.e., accepts data without responding any communication signals). This is useful only when two display cards use the same palette address and plugged in the PCI bus at the same time (such as MPEQ or Video capture). In such case, PCI VGA is silent while MPEQ/Video capture is set to function normally.

BIOS Features à OS Select for DRAM > 64MB

OS Select for DRAM > 64MB

OS/2
Non-OS/2

Set to OS/2 if your system is utilizing an OS/2 operating system and has a memory size of more than 64 MB.

AWARD BIOS

BIOS Features à Video BIOS Shadow

Video BIOS Shadow

Enabled

Disabled

VGA BIOS Shadowing means to copy video display card BIOS into the DRAM area. This enhances system performance because DRAM access time is faster than ROM.

BIOS Features à C800-CBFF Shadow

BIOS Features à CC00-CFFF Shadow

BIOS Features à D000-D3FF Shadow

BIOS Features à D400-D7FF Shadow

BIOS Features à D800-DBFF Shadow

BIOS Features à DC00-DFFF Shadow

C8000-CBFFF

Shadow

Enabled

Disabled

These six items are for shadowing ROM code on other expansion cards. Before you set these parameters, you need to know the specific addresses of that ROM code. If you do not know this information, enable all the ROM shadow settings.



Note: The F000 and E000 segments are always shadowed because BIOS code occupies these areas.

AWARD BIOS

3.4 Chipset Features Setup

The "Chipset Features Setup" includes settings for the chipset dependent features. These features are related to system performance.

ROM PCI/ISA BIOS (XXXXXXXX)	
CHIPSET FEATURES SETUP	
AWARD SOFTWARE, INC.	
Auto Configuration: Enabled	AGP Aperture Size (MB) :64
DRAM Speed Selection :60 ns	Pentium II Micro Codes :Disabled
MA Wait State :Slow	***** Jumpless Setup *****
EDO RAS# To CAS# Delay :2	Manufacture Frequency Default: Mhz
EDO RAS# Precharge Time :3	CPU Clock Frequency :66.8 Mhz
EDO DRAM Read Burst :x222	CPU Clock Ratio :3.5
EDO DRAM Write Burst :x222	
SDRAM(CAS Lat/RAS-to-CAS):2/2	
SDRAM RAS Precharge Time :2T	
DRAM Loading :Normal	
DRAM ECC Function :Disabled	
CPU-to-PCI IDE Posting :Enabled	
Video BIOS Cacheable :Disabled	
Video RAM Cacheable :Enabled	
8-bit I/O Recovery Time :4	ESC: Quit áâàß : Select Item
16-bit I/O Recovery Time :1	F1 : Help PU/PD/+/- : Modify
Memory Hole At 15M-16M :Disabled	F5 : Old Values (Shift) F2 : Color
Passive Release :Disabled	F6 : Load Setup Defaults
Delayed Transaction :Disabled	F7 : Load Turbo Defaults



Caution: Make sure you fully understand the items contained in this menu before you try to change anything. You may change the parameter settings to improve system performance. However, it may cause system unstable if the setting are not correct for your system configuration.

AWARD BIOS

Chipset Features à Auto Configuration

Auto Configuration

Enabled

Disabled

When **Enabled**, the DRAM and cache related timing are set to pre-defined value according to CPU type and clock. Select **Disable** if you want to specify your own DRAM timing.

Chipset Features à DRAM Speed Selection

DRAM Speed

Selection

50 ns

60 ns

There are two sets of DRAM timing parameters can be automatically set by BIOS, 50ns and 60ns.

Chipset Features à MA Wait State

MA Wait State

Slow

Fast

To enable or disable one additional MA (DRAM memory address) wait state. The default setting is **Slow**. Set it to Fast if you have heavy loading (many chip count) or lower speed DRAM.

Chipset Features à EDO RAS# to CAS# Delay

EDO RAS# to CAS#

Delay

2

3

This option allows you to set the wait state between row address strobe (RAS) and column address strobe (CAS) signals.

Chipset Features à EDO RAS# Precharge Time

EDO RAS# Precharge

Time

3

4

This parameter specifies the number of clocks required to deassert the RAS signal to prevent DRAM from losing data after performing a read. This operation is called Precharge.

AWARD BIOS

Chipset Features à EDO DRAM Read Burst

<u>EDO DRAM Read</u>
<u>Burst</u>

x333

x222

Read Burst means to read four continuous memory cycles on four predefined addresses from the DRAM. The default value is **x222** for 60ns EDO DRAM. Which means the 2nd,3rd and 4th memory cycles are 2 CPU clocks for EDO. The value of x is the timing of first memory cycle.

Chipset Features à EDO DRAM Write Burst

<u>EDO DRAM Write</u>
<u>Burst</u>

x333

x222

Write Burst means to write four continuous memory cycles on four predefined addresses to the DRAM. The default value is **x222** for 60ns EDO DRAM. Which means the 2nd,3rd and 4th memory cycles are 2 CPU clocks for EDO. The value of x is the timing of first memory cycle.

Chipset Features à SDRAM(CAS Lat/RAS-to-CAS)

<u>SDRAM(CAS</u>
<u>Lat/RAS-to-CAS)</u>

2/2

3/3

These are timing of SDRAM CAS Latency and RAS to CAS Delay, calculated by clocks. They are important parameters affects SDRAM performance, default is 2 clocks. If your SDRAM has unstable problem, change 2/2 to 3/3.

Chipset Features à SDRAM RAS Precharge Time

<u>SDRAM RAS</u>
<u>Precharge Time</u>

2T

3T

The RAS Precharge means the timing to inactive RAS and the timing for DRAM to do precharge before next RAS can be issued. RAS is the address latch control signal of DRAM row address. The default setting is **3 clocks**.

AWARD BIOS

Chipset Features à DRAM Loading

DRAM Loading

Normal
Heavy

When you find the system unstable, check the DRAM chip count. If the chip count is more than 64, set this option to Heavy.



Tip: 64 is only for your reference. Sometimes you may try to set this option to Heavy as long as the chip count is large.

Tip: The driving capability of new generation chipset is limited because the lack of memory buffer (to improve performance). This makes DRAM chip count an important factor to be taking into consideration when you install DIMM. Unfortunately, there is no way that BIOS can identify the correct chip count, you need to calculate the chip count by yourself. The simple rule is: By visual inspection, use only DIMM which is less than 16 chips.

Chipset Features à DRAM ECC Function

DRAM ECC Function

Enabled
Disabled

This item lets you enable or disable DRAM ECC function. The ECC algorithm has the ability to detect double bit error and automatically correct single bit error.

Chipset Features à CPU-to-PCI IDE Posting

CPU-to-PCI IDE Posting

Enabled
Disabled

To enable or disable CPU to PCI IDE post write cycle. The IDE write cycles will be queued in the FIFO or buffer, and CPU can be released to do next job. Disable it, if you find any IDE compatibility problem.

AWARD BIOS

Chipset Features à Video BIOS Cacheable

<u>Video BIOS Cacheable</u>

Enabled
Disabled

Allows the video BIOS to be cached to allow faster video performance.

Chipset Features à Video RAM Cacheable

<u>Video RAM Cacheable</u>

Enabled
Disabled

This item lets you cache Video RAM A000 and B000.

Chipset Features à 8 Bit I/O Recovery Time

<u>8 Bit I/O Recovery Time</u>

1
2
3
4
5
6
7
8
NA

For some old I/O chips, after the execution of an I/O command, the device requires a certain amount of time (recovery time) before the execution of the next I/O command. Because of new generation CPU and mainboard chipset, the assertion of I/O command is faster, and sometimes shorter than specified I/O recovery time of old I/O devices. This item lets you specify the delay of 8-bit I/O command by count of ISA bus clock. If you find any unstable 8-bit I/O card, you may try to extend the I/O recovery time via this item. The BIOS default value is **4 ISA clock**. If set to NA, the chipset will insert 3.5 system clocks.

AWARD BIOS

Chipset Features à 16 Bit I/O Recovery Time

<u>16 Bit I/O Recovery Time</u>	
1	The same as 16-bit I/O recovery time. This item lets you specify the recovery time for the execution of 16-bit I/O commands by count of ISA bus clock. If you find any of the installed 16-bit I/O cards unstable, try extending the I/O recovery time via this item. The BIOS default value is 1 ISA clocks . If set to NA, the chipset will automatically insert 3.5 system clocks.
2	
3	
4	
NA	

Chipset Features à Memory Hole At 15M-16M

<u>Memory Hole At 15M-16M</u>	
Enabled	This option lets you reserve system memory area for special ISA cards. The chipset accesses code/data of these areas from the ISA bus directly. Normally, these areas are reserved for memory mapped I/O card.
Disabled	

Chipset Features à Passive Release

<u>Passive Release</u>	
Enabled	This item lets you control the Passive Release function of the PIIX4 chipset (Intel PCI to ISA bridge). This function is used to meet latency of ISA bus master. Try to enable or disable it, if you have ISA card compatibility problem.
Disabled	

Chipset Features à Delayed Transaction

<u>Delayed Transaction</u>	
Enabled	This item lets you control the Delayed Transaction function of the PIIX4 chipset (Intel PCI to ISA bridge). This function is used to meet latency of PCI cycles to or from ISA bus. Try to enable or disable it, if you have ISA card compatibility problem.
Disabled	

AWARD BIOS

Chipset Features à AGP Aperture Size (MB)

<u>AGP Aperture Size (MB)</u>
4
8
16
32
64
128
256

This item lets you determine the effective size of the Graphic Aperture.

Chipset Features à Pentium II Micro Codes

<u>Pentium II Micro Codes</u>
Enabled
Disabled

The micro codes are used to fix bugs of Pentium II CPU, we strongly recommend to enable this item for system reliability reason. However, this microcode may slightly reduce CPU performance. We provide this option for your convenience if you like to test it.

Chipset Features à Manufacture Frequency Default

<u>Manufacture Frequency Default</u>
Depends on the CPU type

This item only reminds you of the actual CPU frequency while clearing CMOS or pressing "Home" key. The default setting is 233 Mhz, you can modify it to match the actual CPU frequency by using the utility - flash.exe.

Chipset Features à CPU Clock Frequency

<u>CPU Clock Frequency</u>
66.8 Mhz
68.5 Mhz
75.0 Mhz
83.3 Mhz

This item lets you set external clock (bus clock). The possible settings of current Klamath CPU available on the market are 66.8 Mhz, the correct setting may vary because of new CPU product, refer to your CPU specification for more details.

AWARD BIOS

Chipset Features à CPU Clock Ratio

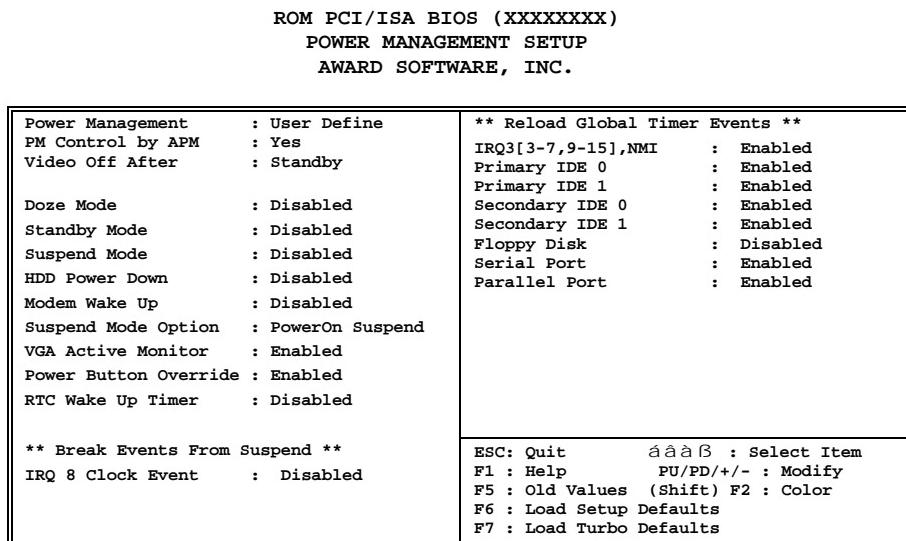
<u>CPU Clock Ratio</u>
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0

Intel Pentium II (Klamath) is designed to have different Internal (Core) and External (Bus) frequency. This item lets you select the ratio of Core/Bus frequency. The default value is 3.5x.

AWARD BIOS

3.5 Power Management Setup

The Power Management Setup screen enables you to control the mainboard green features. See the following screen.



Power Management à Power Management

<u>Power Management</u>	
Max Saving	
Mix Saving	
User Define	
Disabled	

This function allows you to set the default parameters of power-saving modes. Set to **Disable** to turn off power management function. Set to User Define to choose your own parameters.

Mode	Doze	Standby	Suspend	HDD Power Down
Min Saving	1 hour	1 hour	1 hour	15 min
Max Saving	1 min	1 min	1 min	1 min

AWARD BIOS

Power Management à PM Controlled by APM

<u>PM Controlled by</u>	
<u>APM</u>	If "Max Saving" is selected, you can turn on this item, transfer power management control to APM (Advanced Power Management) and enhance power saving function. For example, stop CPU internal clock.
Yes	
No	

Power Management à Video Off After

<u>Video Off After</u>	To turn off video monitor at which power down mode.
N/A	
Doze	
Standby	
Suspend	

Power Management à Doze Mode

<u>Doze Mode</u>	This item lets you set the period of time after which the system enters into Doze mode. The system activity (or event) is detected by monitoring the IRQ signals or other events (such as I/O).
Disabled	
1 Min	
2 Min	
4 Min	
8 Min	
12 Min	
20 Min	
30 Min	
40 Min	
1 Hour	

AWARD BIOS

Power Management à Standby Mode

Standby Mode

Disabled
1 Min
2 Min
4 Min
8 Min
12 Min
20 Min
30 Min
40 Min
1 Hour

This item lets you set the period of time after which the system enters into Standby mode. In this mode, the monitor power-saving feature activates. Any activity detected returns the system to full power. The system activity (or event) is detected by monitoring the IRQ signals or other events (such as I/O).

Power Management à Suspend Mode

Suspend Mode

Disabled
1 Min
2 Min
4 Min
8 Min
12 Min
20 Min
30 Min
40 Min
1 Hour

This item lets you set the period of time after which the system enters into Suspend mode. The Suspend mode can be Power On Suspend or Suspend to Hard Drive, selected by "Suspend Mode Option".

Power Management à HDD Power Down

HDD Power Down

Disabled
1 Min
.....
15 Min

This option lets you specify the IDE HDD idle time before the device enters the power down state. This item is independent from the power states previously described in this section (Standby and Suspend).

AWARD BIOS

Power Management à Modem Wake Up

Modem Wake Up

Enabled
Disabled

This option lets you specify enable or disable Modem Wake Up function.

Power Management à Suspend Mode Option

Suspend Modem Option

PowerOn Suspend
Suspend to Disk

You can select suspend mode by this item. **Power On Suspend** is the traditional Green PC suspend mode, the CPU clock is stop, all other devices are shut off. But power must be kept On to detect activities from modem, keyboard/mouse and returns the system to full power. The system activities is detected by monitoring the IRQ signals or I/O. **Suspend to Hard Drive** saves system status, memory and screen image into hard disk, then the power can be totally Off. Next time, when power is turned On, the system goes back to your original work within just few seconds, which depending on your memory size. You need utility AOZVHDD to reserve disk space.

Power Management à VGA Active Monitor

VGA Active Monitor

Enabled
Disabled

To enable or disable the detection of VGA activity for power down state transition.

AWARD BIOS

Power Management à Power Button Override

<u>Power Button Override</u>

Enabled

Disabled

This is a specification of ACPI and supported by hardware. When **Enabled**, the soft power switch on the front panel can be used to control power On, Suspend and Off. If the switch is pressed less than 4 sec during power On, the system will go into Suspend mode. If the switch is pressed longer than 4 sec, the system will be turned Off. The default setting is **Disabled**, soft power switch is only used to control On and Off, there is no need to press 4 sec, and there is no Suspend.

Power Management à RTC Wake Up Timer

<u>RTC Wake Up Timer</u>

Enabled

Disabled

This option lets you enable or disable the RTC Wake Up function.

Power Management à WakeUp Date (of Month)

<u>WakeUp Date (of Month)</u>
--

0

1

.....

31

This item is displayed when you enable the RTC Wake Up Timer option. Here you can specify what date you want to wake up the system. For Example, setting to 15 will wake up the system on the 15th day of every month.



Note: Setting this item to 0 will wake up the system on the specified time (which can be set in the WakeUp Time item) every day.

AWARD BIOS

Power Management à WakeUp Time (hh:mm:ss)

WakeUp Time
(hh:mm:ss)
hh:mm:ss

This item is displayed when you enable the RTC Wake Up Timer option. Here you can specify what time you want to wake up the system.

Power Management à IRQ 8 Clock Event

IRQ 8 Clock Event

Enabled
Disabled

To enable or disable the detection of IRQ8 (RTC) event for power down state transition. OS2 has periodically IRQ8 (RTC) interruptions, If IRQ8 is not set to **Disabled**, OS/2 may fail to go into Doze/Standby/Suspend mode.

Power Management à IRQ [3-7,9-15],NMI

IRQ [3-7,9-15],NMI

Enabled
Disabled

To enable or disable the detection of IRQ3-7, IRQ9-15 or NMI interrupt events for power down state transition.

Power Management à Primary IDE 0

Power Management à Primary IDE 1

Power Management à Secondary IDE 0

Power Management à Secondary IDE 1

Power Management à Floppy Disk

Power Management à Serial Port

Power Management à Parallel Port

Primary IDE 0

Enabled
Disabled

These items enable or disable the detection of IDE, floppy, serial and parallel port activities for power down state transition. Actually it detects the read/write to/from I/O port.

AWARD BIOS

3.6 PNP/PCI Configuration Setup

The PNP/PCI Configuration Setup allows you to configure the ISA and PCI devices installed in your system. The following screen appears if you select the option "PNP/PCI Configuration Setup" from the main menu.

ROM PCI/ISA BIOS (XXXXXXXX)	
PNP/PCI CONFIGURATION SETUP	
AWARD SOFTWARE, INC.	
PnP OS Installed : No	PCI IDE IRQ Map To : PCI-Auto
Resources Controlled By : Manual	Primary IDE INT# : A
Reset Configuration Data : Disabled	Secondary IDE INT# : B
IRQ 3 assigned to : Legacy ISA	Used MEM base addr : N/A
IRQ 4 assigned to : Legacy ISA	Used MEM Length : 8K
IRQ 5 assigned to : PCI/ISA PnP	
IRQ 7 assigned to : PCI/ISA PnP	
IRQ 9 assigned to : PCI/ISA PnP	
IRQ 10 assigned to : PCI/ISA PnP	
IRQ 11 assigned to : PCI/ISA PnP	
IRQ 12 assigned to : PCI/ISA PnP	
IRQ 14 assigned to : PCI/ISA PnP	
IRQ 15 assigned to : PCI/ISA PnP	
DMA 0 assigned to : PCI/ISA PnP	
DMA 1 assigned to : PCI/ISA PnP	ESC: Quit àààß : Select Item
DMA 3 assigned to : PCI/ISA PnP	F1 : Help PU/PD/+/- : Modify
DMA 5 assigned to : PCI/ISA PnP	F5 : Old Values (Shift) F2 : Color
DMA 6 assigned to : PCI/ISA PnP	F6 : Load Setup Defaults
DMA 7 assigned to : PCI/ISA PnP	F7 : Load Turbo Defaults

PNP/PCI Configuration à PnP OS Installed

<u>PnP OS Installed</u>	Normally, the PnP resources are allocated by BIOS during POST (Power-On Self Test). If you are using a PnP operating system (such as Windows 95), set this item to Yes to inform BIOS to configure only the resources needed for booting (VGA/IDE or SCSI). The rest of system resources will be allocated by PnP operating system.
Yes	
No	

AWARD BIOS

PNP/PCI Configuration à Resources Controlled By

Resources Controlled by	Setting this option to Manual allows you to individually assign the IRQs and DMAs to the ISA and PCI devices. Set this to Auto to enable the auto-configuration function.
Auto	
Manual	

PNP/PCI Configuration à Reset Configuration Data

Reset Configuration Data	In case conflict occurs after you assign the IRQs or after you configure your system, you can enable this function, allow your system to automatically reset your configuration and reassign the IRQs, DMAs, and I/O address.
Enabled	
Disabled	

PNP/PCI Configuration à IRQ3 (COM2)

PNP/PCI Configuration à IRQ4 (COM1)

PNP/PCI Configuration à IRQ5 (Network/Sound or Others)

PNP/PCI Configuration à IRQ7 (Printer or Others)

PNP/PCI Configuration à IRQ9 (Video or Others)

PNP/PCI Configuration à IRQ10 (SCSI or Others)

PNP/PCI Configuration à IRQ11 (SCSI or Others)

PNP/PCI Configuration à IRQ12 (PS/2 Mouse)

PNP/PCI Configuration à IRQ14 (IDE1)

PNP/PCI Configuration à IRQ15 (IDE2)

IRQ 3	If your ISA card is not PnP compatible and requires a special IRQ to support its function, set the selected IRQ to Legacy ISA . This setting informs the PnP BIOS to reserve the selected IRQ for the installed legacy ISA card. The default is PCI/ISA PnP . Take note that PCI cards are always PnP compatible (except old PCI IDE card).
Legacy ISA	
PCI/ISA PnP	

AWARD BIOS

PNP/PCI Configuration à DMA 0
PNP/PCI Configuration à DMA 1
PNP/PCI Configuration à DMA 3
PNP/PCI Configuration à DMA 5
PNP/PCI Configuration à DMA 6
PNP/PCI Configuration à DMA 7

DMA 0

Legacy ISA
PCI/ISA PnP

If your ISA card is not PnP compatible and requires a special DMA channel to support its function, set the selected DMA channel to **Legacy ISA**. This setting informs the PnP BIOS to reserve the selected DMA channel for the installed legacy ISA card. The default is **PCI/ISA PnP**. Take note that PCI card does not require DMA channel.

PNP/PCI Configuration à PCI IDE IRQ Map To

PCI IDE IRQ Map To

ISA
PCI-Slot1
PCI-Slot2
PCI-Slot3
PCI-Slot4
PCI-Auto

Some old PCI IDE add-on cards are not fully PnP compatible. These cards require you to specify the slot in use to enable BIOS to properly configure the PnP resources. This function allows you to select the PCI slot for any PCI IDE add-on card present in your system. Set this item to **Auto** to allow BIOS to automatically configure the installed PCI IDE card(s).

PNP/PCI Configuration à Primary IDE INT#
PNP/PCI Configuration à Secondary IDE INT#

Primary IDE INT#

A
B
C
D

These two items, in conjunction with item "PCI IDE IRQ Map To", specify the IRQ routing of the primary or secondary channel of the PCI IDE add-on card (not the onboard IDE). Each PCI slot has four PCI interrupts aligned as listed in the table below. You must specify the slot in the "PCI IDE IRQ Map To", and set the PCI interrupt (INTx) here according to the interrupt connection on the card.

AWARD BIOS

PCI Slot	Location 1 (pin A6)	Location 2 (pin B7)	Location 3 (pin A7)	Location 4 (pin B8)
Slot 1	INTA	INTB	INTC	INTD
Slot 2	INTB	INTC	INTD	INTA
Slot 3	INTC	INTD	INTA	INTB
Slot 4	INTD	INTA	INTB	INTC
Slot 5 (if any)	INTD	INTA	INTB	INTC

PNP/PCI Configuration à Used MEM Base Addr

Used MEM base addr

N/A
C800
CC00
D000
D400
D800
DC00

This item, in conjunction with the "Used MEM Length", lets you set a memory space for non-PnP compatible ISA card. This item specifies the memory base (start address) of the reserved memory space. The memory size is specified in the "Used MEM Length".

PNP/PCI Configuration à Used MEM Length

Used MEM Length

8K
16K
32K
64K

If your ISA card is not PnP compatible and requires special memory space to support its function, specify the memory size in this parameter to inform the PnP BIOS to reserve the specified memory space for installed legacy ISA card.

3.7 Load Setup Defaults

The "Load Setup Defaults" option loads optimized settings for optimum system performance. Optimal settings are relatively safer than the Turbo settings. We recommend you to use the Optimal settings if your system has large memory size and fully loaded with add-on card (for example, a file server using double-sided 8MB SIMM x4 and SCSI plus Network card occupying the PCI and ISA slots).

Optimal is not the slowest setting for this mainboard. If you need to verify a unstable problem, you may manually set the parameter in the "BIOS Features Setup" and "Chipset Features Setup" to get slowest and safer setting.

3.8 Load Turbo Defaults

The "Load Turbo Defaults" option gives better performance than Optimal values. However, Turbo values may not be the best setting of this mainboard but these values are qualified by the AOpen RD and QA department as the reliable settings especially if you have limited loading of add-on card and memory size (for example, a system that contains only a VGA/Sound card and two SIMMs).

To attain the best system performance, you may manually set the parameters in the "Chipset Features Setup" to get proprietary setting. Make sure that you know and understand the functions of every item in Chipset Setup menu. The performance difference of Turbo from Optimal is normally around 3% to 10%, depending on the chipset and the application.

AWARD BIOS

3.9 Integrated Peripherals

The following screen appears if you select the option "Integrated Peripherals" from the main menu. This option allows you to configure the I/O features.

ROM PCI/ISA BIOS (XXXXXXXX)		
INTEGRATED PERIPHERALS		
AWARD SOFTWARE, INC.		
IDE HDD Block Mode:	:	Enabled
IDE Primary Master PIO	:	Auto
IDE Primary Slave PIO	:	Auto
IDE Secondary Master PIO	:	Auto
IDE Secondary Slave PIO	:	Auto
IDE Primary Master UDMA	:	Auto
IDE Primary Slave UDMA	:	Auto
IDE Secondary Master UDMA	:	Auto
IDE Secondary Slave UDMA	:	Auto
On-Chip Primary PCI-IDE	:	Enabled
On-Chip Secondary PCI-IDE	:	Enabled
USB Keyboard Support	:	Disabled
USB IRQ Released	:	No
Onboard FDC Controller	:	Enabled
Onboard Serial Port 1	:	AUTO
Onboard Serial Port 2	:	AUTO
Onboard Parallel Port	:	378/IRQ7
Parallel Port Mode	:	SPP
		Onboard IR Controller : Enabled
		ESC: Quit àààß : Select Item
		F1 : Help PU/PD/+/- : Modify
		F5 : Old Values (Shift) F2 : Color
		F6 : Load Setup Defaults
		F7 : Load Turbo Defaults

Integrated Peripherals à IDE HDD Block Mode

<u>IDE HDD Block Mode</u>	This feature enhances disk performance by allowing multisector data transfers and eliminates the interrupt handling time for each sector. Most IDE drives, except with old designs, can support this feature.
Enabled	
Disabled	

AWARD BIOS

Integrated Peripherals à IDE Primary Master PIO

Integrated Peripherals à IDE Primary Slave PIO

Integrated Peripherals à IDE Secondary Master PIO

Integrated Peripherals à IDE Secondary Slave PIO

IDE Primary Master

PIO

Auto

Mode 1

Mode 2

Mode 3

Mode 4

Setting this item to **Auto** activates the HDD speed auto-detect function. The PIO mode specifies the data transfer rate of HDD. For example: mode 0 data transfer rate is 3.3MB/s, mode 1 is 5.2MB/s, mode 2 is 8.3MB/s, mode 3 is 11.1MB/s and mode 4 is 16.6MB/s. If your hard disk performance becomes unstable, you may manually try the slower mode.



Caution: It is recommended that you connect the first IDE device of each channel to the endmost connector of the IDE cable. Refer to section "Connectors" for details on how to connect IDE device(s).

Integrated Peripherals à IDE Primary Master UDMA

Integrated Peripherals à IDE Primary Slave UDMA

Integrated Peripherals à IDE Secondary Master UDMA

Integrated Peripherals à IDE Secondary Slave UDMA

IDE Primary Master

UDMA

Auto

Disabled

This item allows you to set the Ultra DMA/33 mode supported by the hard disk drive connected to your primary IDE connector.

Integrated Peripherals à On-Chip Primary PCI IDE

Integrated Peripherals à On-Chip Secondary PCI IDE

On-Chip Primary PCI

IDE

Enabled

Disabled

This parameter lets you enable or disable the IDE device connected to the primary IDE connector.

AWARD BIOS

Integrated Peripherals à USB Legacy Support

USB Legacy Support

Enabled

Disabled

This item lets you enable or disable the USB keyboard driver within the onboard BIOS. The keyboard driver simulates legacy keyboard command and let you use USB keyboard during POST or after boot if you don't have USB driver in the operating system.



Caution: You can not use both USB driver and USB legacy keyboard at the same time. Disable "USB Legacy Support" if you have USB driver in the operating system.

Integrated Peripherals à USB IRQ Released

USB IRQ Released

Yes

No

USB device is default to use PCI INTD#, the same as PCI slot4. If you installed PCI card on slot4 and require to use INTD#, set this item to Yes. The USB device will then be disabled.



Note: Normally, PCI VGA does not need PCI interrupt, you may put PCI VGA on slot4.

Integrated Peripherals à Onboard FDC Controller

Onboard FDC Controller

Enabled

Disabled

Setting this parameter to **Enabled** allows you to connect your floppy disk drives to the onboard floppy disk connector instead of a separate controller card. Change the setting to Disabled if you want to use a separate controller card.

Integrated Peripherals à Onboard Serial Port 1

Integrated Peripherals à Onboard Serial Port 2

AWARD BIOS

Onboard Serial Port 1

Auto
3F8/IRQ4
2F8/IRQ3
3E8/IRQ4
2E8/IRQ3
Disabled

This item allow you to assign address and interrupt for the board serial port. Default is **Auto**.



Note: If you are using an network card, make sure that the interrupt does not conflict.

Integrated Peripherals à Onboard IR Controller

Onboard IR Controller

Enabled
Disabled

To enable or disable onboard wireless Infrared controller.

Integrated Peripherals à IR Address Selection

IR Address Selection

2E0H
2E8H
2F8H
3E0H
3E8H
3F8H

This item selects the address of IR controller.

Integrated Peripherals à IR Mode

IR Mode

ASKIR
IrDA

This item selects the mode of onboard wireless Infrared controller. The IrDA standard includes both HPSIR and FIR, the driver in the Win95 will automatically change to different mode according to different chip.

AWARD BIOS

- **ASKIR** – Select this setting if you installed an Infrared module via IrDA connector (refer to section 2.3 "Connectors"). This ASKIR setting allows infrared serial communication at a maximum baud rate of 56K baud.
- **HPSIR** – Select this setting if you installed an Infrared module in your system via IrDA connector (refer to section 2.3 "Connectors"). The HPSIR setting allows infrared serial communication at a maximum baud rate of 115K baud.
- **FIR** – Select this setting if you installed an Infrared module via IrDA connector (refer to section 2.3 "Connectors"). This FIR (Fast IR) setting allows infrared serial communication at a maximum baud rate of 4M baud.

Integrated Peripherals à IR IRQ Selection

<u>IR IRQ Selection</u>
3
4
10
11

This item selects the IRQ of IR port.



Note: If you are using a network card, make sure that the interrupt does not conflict.

Integrated Peripherals à FIR Mode Use DMA

<u>FIR Mode Use DMA</u>
Disabled
0
1
3

This item selects the DMA channel of Fast IR port.



Note: If you are using a sound card, make sure that the interrupt does not conflict.

AWARD BIOS

Integrated Peripherals à Onboard Parallel Port

Onboard Parallel Port
3BC/IRQ7
378/IRQ7
278/IRQ7
Disabled

This item controls the onboard parallel port address and interrupt.



Note: If you are using an I/O card with a parallel port, make sure that the addresses and IRQ do not conflict.

Integrated Peripherals à Parallel Port Mode

Parallel Port Mode
SPP
EPP
ECP
ECP + EPP

This item lets you set the parallel port mode. The mode options are SPP (Standard Parallel Port), EPP (Enhanced Parallel Port) and ECP (Extended Parallel Port). SPP is the IBM AT and PS/2 compatible mode. EPP enhances the parallel port throughput by directly writing/reading data to/from parallel port without latch. ECP supports DMA and RLE (Run Length Encoded) compression and decompression.

Integrated Peripherals à ECP Mode Use DMA

ECP Mode Use DMA
3
1

This item lets you set the DMA channel of ECP mode.

AWARD BIOS

3.10 Password Setting

Password prevents unauthorized use of your computer. If you set a password, the system prompts for the correct password before boot or access to Setup.

To set a password:

1. At the prompt, type your password. Your password can be up to 8 alphanumeric characters. When you type the characters, they appear as asterisks on the password screen box.
2. After typing the password, press.
3. At the next prompt, re-type your password and press again to confirm the new password. After the password entry, the screen automatically reverts to the main screen.

To disable the password, press when prompted to enter the password. The screen displays a message confirming that the password has been disabled.

3.11 IDE HDD Auto Detection

If your system has an IDE hard drive, you can use this function to detect its parameters and enter them into the "Standard CMOS Setup" automatically.

This routine only detects one set of parameters for your IDE hard drive. Some IDE drives can use more than one set of parameters. If your hard disk is formatted using different parameters than those detected, you have to enter the parameters manually. If the parameters listed do not match the ones used to format the disk, the information on that disk will not be accessible. If the auto-detected parameters displayed do not match those that used for your drive, ignore them. Type N to reject the values and enter the correct ones manually from the Standard CMOS Setup screen.

3.12 Save & Exit Setup

This function automatically saves all CMOS values before leaving Setup.

3.13 Load EEPROM Default

Except "Load Setup Default" and "Load Turbo Default", you may also use "Save EEPROM Default " to save your own settings into EEPROM, and reload by using this item.

3.14 Save EEPROM Default

You may use this item to save your own settings into EEPROM. Then, if the data in CMOS is lost or you forget the previous settings, you may use "Load EEPROM Default " to reload.

3.15 Exit without Saving

Use this function to exit Setup without saving the CMOS value changes. Do not use this option if you want to save the new configuration.

3.16 NCR SCSI BIOS and Drivers

The NCR 53C810 SCSI BIOS resides in the same flash memory chip as the system BIOS. The onboard NCR SCSI BIOS is used to support NCR 53C810 SCSI control card without BIOS code.

The NCR SCSI BIOS directly supports DOS, Windows 3.1 and OS/2. For better system performance, you may use the drivers that come with the NCR SCSI card or with your operating system. For details, refer to the installation manual of your NCR 53C810 SCSI card.

3.17 BIOS Flash Utility

The BIOS Flash utility allows you to upgrade the system BIOS. To get the AOpen Flash utility and the upgrade BIOS file, contact your local distributor or visit our homepage at <http://www.aopen.com.tw>. Please make sure that you have the correct BIOS ready, the BIOS filename is normally like AP5TR110.BIN, which means model AP5T BIOS revision 1.10.

AWARD BIOS

There are two useful programs, Checksum utility CHECKSUM.EXE and AOpen Flash utility AOFLASH.EXE. Follow the procedures below to upgrade your BIOS.

[CHECKSUM.EXE]

This utility will help you to determine if the BIOS has been downloaded correctly or not.

1. Execute

C:> CHECKSUM Biosfile.bin

Biosfile.bin is the filename of the BIOS code.

2. The utility will show "Checksum is ssss".

3. Compare the "ssss" with original checksum posted on Web or BBS. If they are different, please do not proceed any further and try to download the BIOS again.

[AOFLASH.EXE]

This utility will try to check the mainboard model, BIOS version and Super/Ultra IO chip model. To ensure the correct BIOS file for the correct mainboard and IO chip. This utility will permanently replace your original BIOS content after flashing.

1. Bootup the system from DOS prompt without loading any memory manager (HIMEM, EMM386, QEMM386, ...).

2. Execute

C:> AOFLASH Biosfile.bin

Biosfile.bin is the filename of the BIOS code.

3. After loading the new BIOS code, the utility will prompt you to save original BIOS code into your HDD or floppy. Please press "Y" to store it as "BIOS.OLD".

4. After the old BIOS has been successfully saved, press "Y" to replace BIOS.

5. DO NOT turn off the power during "FLASHING".

6. Reboot the system by turn off the power after "FLASHING".

7. Press "DEL" key to enter BIOS setup during POST.

8. Reload the "BIOS SETUP DEFAULT" and reconfigure other items as previous set.

9. Save & Exit. Done!

AWARD BIOS



Warning: DO NOT turn off the power during "FLASHING". If the BIOS programming is not successfully finished, the system will not be boot again, and you may need to physically replace the BIOS chip.



Tip: You may load back original BIOS "BIOS.OLD" by the same procedure.

Appendix A

Jumper Table Summary

Selecting the CPU Frequency

This motherboard is jumper-less design. The only jumper left is Clear CMOS, which is reserved in case you forget your password.

The CPU frequency selection is set by going into:

BOIS Setup à Chipset Features Setup à CPU Clock Frequency
(The possible setting is 66, 68.5, 75 and 83.3 MHz)

BOIS Setup à Chipset Features Setup à CPU Clock Ratio
(The possible setting is 1.5x, 2x, 2.5x, 3x, 3.5x, 4x, 4.5x, 5x, 5.5x, 6x, 6.5x, 7x, 7.5x, and 8x)

INTEL Pentium II	CPU Core Frequency	Ratio	External Bus Clock
Klamath 233	233MHz =	3.5x	66MHz
Klamath 266	266MHz =	4x	66MHz
Klamath 300	300MHz =	4.5x	66MHz
Klamath 333	333MHz =	5x	66MHz



Warning: The possible settings of current CPU available on the market are listed above, the default setting is Pentium II 233mhz. The other settings are only for internal test, which may cause serious system damage.

Jumper Table Summary

Selecting the CPU Voltage

This motherboard supports Pentium II (Klamath) VID function, the CPU core voltage is automatically detected, the range is from 1.3V to 3.5V.

Clear CMOS

<u>JP14</u>	<u>Clear CMOS</u>
1-2	Normal operation (default)
2-3	Clear CMOS



Tip: If your system hangs or fails to boot because of over-clocking, please clear CMOS and the the system will go back to default setting. Except using JP14, you can also press <Home> key to clear CMOS while system booting.

Appendix B

Frequently Asked Question



Note: FAQ may be updated without notice. If you cannot find the information that you need in this appendix, visit our WWW home page, (address: <http://www.aopen.com.tw>) and check the FAQ area and other new information.

Q: How can I identify the mainboard BIOS version?

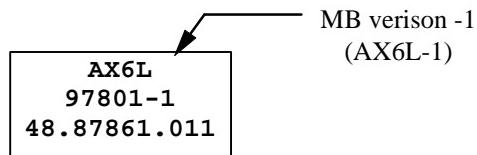
A: The AOpen mainboard BIOS version appears on the upper-left corner of the POST (Power-On Self Test) screen. Normally, it starts with R and is found in between the model name and the date. For example:

AP53/AX53 R3.80 Oct.22.1996

 BIOS revision

Q: How can I identify version of the mainboard?

A: The AOpen mainboard version appears as ppppp-x on the PCB, near the PCI slot and is enclosed in a white bordered box. The ppppp is the project code used by AOpen internally and -x is the version code. For example, for AX6L with 97801 project code and -1 version code, the mainboard version appears on the PCB as follows:



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Q: What is MMX?

A: MMX is the new single-line multiple-instruction technology of the new Intel Pentium PP/MT (P55C) and Pentium II (Klamath) CPU. The AMD K6 and Cyrix M2 will support MMX, too. The MMX instructions are specifically useful for multimedia applications (such as 3D video, 3D sound, video conference). The performance can be improved if applications use these instructions. All AOpen MBs have at least dual power onboard to support MMX. It is not necessary to have special chipset for MMX CPU.

Q: What is the performance improvement of Pentium II (Klamath)?

A: Following is the comparison table of the new generation CPU.

DRAM : 64MB EDO or SDRAM

HDD : Quantum Fireball 1280AT

VGA : Matrox Millennium VGA, 4MB, 1024x768 24bit, 85Hz.

OS : Windows 95 4.00.950

CPU	MB	Chipset	Winstone97 Business	Winstone97 High-End
PP/MT-200	AP5T/AX5T	Intel 430TX	48.3	21.9
PP/MT-233	AP5T/AX5T	Intel 430TX	50.5	23.6
Pentium II 200	AX6F	Intel 440FX	45.3	24.1
Pentium II 233	AX6F	Intel 440FX	48.4	26.5
Pentium II 266	AX6F	Intel 440FX	50.8	28.2
Pentium II 266	AX6L	Intel 440LX	54.5	30.8

You can see that Klamath-233 is no better than PP/MT-233 on Business Winstone97, but it has large improvement on High-End Winstone97. It is probably because Klamath has very good floating point performance and is suitable for graphic operation.

Q: What is USB (Universal Serial Bus)?

A: USB is a new 4-pin serial peripheral bus that is capable of cascading low/medium speed peripherals (less than 10Mbit/s) such as keyboard, mouse, joystick, scanner, printer and modem/ISDN. With USB, the traditional complex cables from back panel of your PC can be eliminated.

You need the USB driver to support USB device(s). AOpen MBs are all USB ready, you may get latest BIOS from AOpen web site (<http://www.aopen.com.tw>). Our latest BIOS includes the keyboard driver (called Legacy mode), that simulates USB keyboard to act as AT or PS/2 keyboard and makes it possible to use USB keyboard if you don't have driver

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in your OS. For other USB devices, you may get the drivers from your device vendor or from OS (such as Win95). Be sure to turn off "USB Legacy Support" in BIOS "Chipset Setup" if you have another driver in your OS.

Q: What is P1394?

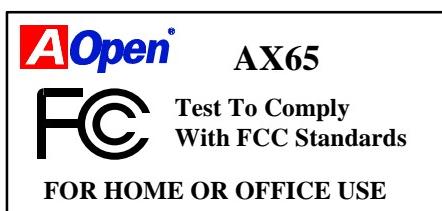
A: P1394 (IEEE 1394) is another standard of high-speed serial peripheral bus. Unlike low or medium speed USB, P1394 supports 50 to 1000Mbit/s and can be used for video camera, disk and LAN. Since P1394 is still under development, there is no P1394 device currently available in the PC market. Also, there is no chipset that can support P1394. Probably in the near future, a card will be developed to support P1394 device.

Q: What is SMBus (System Management Bus, also called I2C bus)?

A: SMBus is a two-wire bus developed for component communication (especially for semiconductor IC). It is most useful for notebook to detect component status and replace hardware configuration pin (pull-high or pull-low). For example, disabling clock of DIMM that does not exist, or detecting battery low condition. The data transfer rate of SMBus is only 100Kbit/s, it allows one host to communicate with CPU and many masters and slaves to send/receive message. The SMBus may be used for jumpless mainboard, the components which support SMBus are not ready yet, we will keep eyes on it.

Q: What is FCC DoC (Declaration of Conformity)?

A: The DoC is new certification standard of FCC regulations. This new standard allows DIY component (such as mainboard) to apply DoC label separately without a shielding of housing. The rule to test mainboard for DoC is to remove housing and test it with regulation 47 CFR 15.31. The DoC test of mainboard is more difficult than traditional FCC test. If the mainboard passes DoC test, that means it has very low EMI radiation and you can use any kind of housing (even paper housing). Following is an example of DoC label.



Q: What is EDO (Extended Data Output) memory?

A: The EDO DRAM technology of EDO is actually very similar to FPM (Fast Page Mode). Unlike traditional FPM that tri-states the memory output data to

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start the pre-charge activity, EDO DRAM holds the memory data valid until the next memory access cycle, that is similar to pipeline effect and reduces one clock state.

Q: What is ECC (Error Checking and Correction)? Do I need special ECC SIMM?

A: The ECC mode needs 8 ECC bits for 64-bit data. Since 36-bit SIMM has 4 bits more for parity, ECC mode can be supported by using only two parity SIMMs. There is no need to have special ECC SIMM. Each time memory is accessed, ECC bits are updated and checked by a special algorithm. The ECC algorithm has the ability to detect double-bit error and automatically correct single-bit error while parity mode can only detect single-bit error. Intel 430HX (P5) and 440FX /440LX (P6) support ECC mode..

Q: What is Bus Master IDE (DMA mode)?

A: The traditional PIO (Programmable I/O) IDE requires the CPU to involve in all the activities of the IDE access including waiting for the mechanical events. To reduce the workload of the CPU, the bus master IDE device transfers data from/to memory without interrupting CPU, and releases CPU to operate concurrently while data is transferring between memory and IDE device. You need the bus master IDE driver and the bus master IDE HDD to support bus master IDE mode. Note that it is different with master/slave mode of the IDE device connection. For more details, refer to section 2.3 "Connectors".

Q: What is the Ultra DMA/33?

A: This is the new specification to improve IDE HDD data transfer rate. Unlike traditional PIO mode, which only uses the rising edge of IDE command signal to transfer data, the DMA/33 uses both rising edge and falling edge. Hence, the data transfer rate is double of the PIO mode 4 or DMA mode 2. (16.6MB/s x2 = 33MB/s).

The following table lists the transfer rate of IDE PIO and DMA modes. The IDE bus is 16-bit, which means every transfer is two bytes.

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Mode	Clock per 33MHz PCI	Clock count	Cycle time	Data Transfer rate
PIO mode 0	30ns	20	600ns	(1/600ns) x 2byte = 3.3MB/s
PIO mode 1	30ns	13	383ns	(1/383ns) x 2byte = 5.2MB/s
PIO mode 2	30ns	8	240ns	(1/240ns) x 2byte = 8.3MB/s
PIO mode 3	30ns	6	180ns	(1/180ns) x 2byte = 11.1MB/s
PIO mode 4	30ns	4	120ns	(1/120ns) x 2byte = 16.6MB/s
DMA mode 0	30ns	16	480ns	(1/480ns) x 2byte = 4.16MB/s
DMA mode 1	30ns	5	150ns	(1/150ns) x 2byte = 13.3MB/s
DMA mode 2	30ns	4	120ns	(1/120ns) x 2byte = 16.6MB/s
DMA/33	30ns	4	120ns	(1/120ns) x 2byte x2 = 33MB/s

Q: What is Flash ROM BIOS? What is the BIOS size?

A: All the mainboards need BIOS (Basic Input/Output System). BIOS is a set of basic I/O control routine grouped together, it provides low level hardware support to the operating system. Traditional mainboard stores BIOS code in EPROM (Erasable Programmable ROM), if BIOS has to be upgraded, you need to remove EPROM from mainboard, clear by ultra-violet (UV) light, re-program, and then insert back.. AOpen mainboards use much easier Flash ROM, only Flash ROM programming utility is necessary, no need to open housing and change the BIOS ROM. You may connect to <http://www.aopen.com.tw> to download BIOS for upgrade.

Q: What is PnP (Plug and Play)?

A: In the past, the IRQ/DMA and memory or I/O space of add-on cards are normally set manually, i.e., by jumper or by proprietary utility. The user has to check the user's guide for the correct setting. Sometimes, resource conflict occurs and this leads to unstable system. The PnP specification suggests a

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standard register interface for both BIOS and OS (such as Win95). These registers are used by BIOS and OS to configure system resource and prevent any conflicts. The IRQ/DMA/Memory will be automatically allocated by PnP BIOS or OS.

Currently, almost all the PCI cards and most ISA cards are PnP compliant. If you are still using a Legacy ISA card that cannot support PnP, set the corresponding resource (IRQ/DMA/memory) to ISA in the BIOS "PCI/PnP Setup".

Q: Why will the system BIOS assign an IRQ to the PCI VGA card?

A: Based on the PCI/PnP specification, system BIOS will automatically assign an IRQ to each PCI add-on card detected regardless of VGA requirement. If you do not want BIOS to assign an IRQ to the installed PCI VGA card, enter the BIOS PCI/PnP Setup and set the specific PCI slot IRQ Priority to "None".

Q: What is ACPI (Advanced Configuration & Power Interface) and OnNow?

A: The ACPI is new power management specification of 1997 (PC97). It intends to save more power by taking full control of power management to operating system and not through BIOS. Because of this, the chipset or super I/O chip needs to provide standard register interface to OS (such as Win97) and provides the ability for OS to shutdown and resume power of different part of chip. The idea is a bit similar to the PnP register interface. ACPI defines momentary soft power switch to control the power state transition. Most likely, it uses the ATX form factor with momentary soft power switch. The most attractive part of ACPI for desktop user is probably the "OnNow" feature, an idea from notebook. This feature allows you to immediately resume to your original work without the long time waiting from bootup, entering Win95 and running Winword. The AX5T with Intel TX chipset can support ACPI.

Q: What is ATX Soft Power On/Off and Momentary Switch?

A: The Soft Power On of the ATX specification means to provide a standby current for special circuit to wait for wakeup event when main power is off. For example, Infrared wakeup, modem wakeup, or voice wakeup. Currently, the most simple usage is to provide standby current for power switch circuit so that power switch can turn on/off the main power through soft power control pin. The ATX power specification does not mention anything about the power switch type. You can use toggle or momentary switch, note that ACPI specification requires momentary switch for power state control. All the AOpen ATX MBs support momentary switch and AX5T/AX58/AX6L support modem wakeup (Modem Ring-On).

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Soft Power Off means to turn off system through software, Windows 95 Shutdown function can be used to verify if your mainboard supports soft power off. AOpen AX5T/AX58/AX6F/AX6L support soft power off.

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Q: What is the AGP (Accelerated Graphic Port)?

A: AGP is a PCI-like bus interface targeted for high-performance 3D graphic. AGP supports only memory read/write operation and single-master single-slave one-to-one only. The AGP uses both rising and falling edge of the 66MHz clock and produces 66MHz x 4byte x 2 = 528MB/s data transfer rate. The AOpen AX6L MB are designed to support AGP via the new Intel Klamath LX chipset.

Q: Does Pentium, Pentium Pro or Pentium II support Deturbo mode?

A: The Deturbo mode was originally designed to slow down CPU speed for old applications (especially old games). It uses programming loop to wait or delay special event. This programming method is considered very bad since the delay of loop highly depends on the CPU speed and the application fails at high-speed CPU. Almost all new applications (including games) use RTC or interrupt to wait event. There is no need for Deturbo mode now. The Turbo switch is now used as Suspend switch. However, some MBs still support Turbo/Deturbo function via keyboard. You can set the system to Deturbo by pressing <Ctrl> <Alt> <->. To back to Turbo mode, press <Ctrl> <Alt> <+->. Note that the Deturbo mode has been removed in new MBs since these require more code space in Flash ROM.

Q: Power Management Icon does not appear in the Windows 95 Control Panel even though the APM under BIOS Setup is enabled.

A: This problem occurs if you did not enable the APM function before you install Windows 95. If you have already installed Windows 95, re-install it after the BIOS APM function is enabled.

Q: Why does the system fail to go into suspend mode under Win95?

A: This problem may be caused by your CDROM settings. The CDROM Auto Insert Notification of Win95 is default enabled, the system will continue to monitor your CDROM, auto-execute application when a CD diskette is loaded, and prevents the system from entering into suspend mode. To resolve this, go into Control Panel → System → Device Manager → CDROM → Setting, and disable the "Auto Insert Notification" function.

Q: What is Windows 95 Registry?

A: The functions of Windows 95 Registry and the Windows 3.1 INI files are almost the same. Both store the hardware and software configurations. The only difference is that Registry is a database while INI is text file. You can run REGEDIT.EXE to further understand the Registry structure. Checking and studying the structure of this file will help you solve some configuration problems.

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Q: Which version of the Windows '95 that I am using?

A: You may determine the version of Windows '95 by following steps.

1. Double click "System" in "Control Panel".
2. Click "General".
3. Look for "System" heading & refer to following,

4.00.950	Windows 95
4.00.950A	Windows 95 + Service Pack or OEM Service Release 1
4.00.950B	OEM Service Release 2 or OEM Service Release 2.1

If you are running OSR 2.1, you may tell it from by checking "USB Supplement to OSR2" in the list of installed program of Add/Remove program tool under Control Panel, and checking for version 4.03.1212 of the Ntkern.vxd file in the Windows\System\Vmm32 folder.

Q: What is LDCM (LAN Desktop Client Manager)?

A: This is a software of Intel. The major goal is to provide an easy way for corporate network administrator to monitor the status of all the clients (workstation). You need at least DMI BIOS for LDCM. AOpen BIOS is also DMI ready but unfortunately, Intel LDCM needs Intel network card and ATI VGA to work properly. It is obviously not suitable for home user to pay LDCM extra cost.

Q: Why do AOpen MBs use many Electrolytic Capacitors instead of Tantalum Capacitor?

A: The quality of Electrolytic capacitor has huge difference depends on model and vendor. Normally, Tantalum capacitor is better than Electrolytic capacitor, but good quality and high price Electrolytic capacitor is even better than Tantalum capacitor. Originally, AOpen motherboards use 100uF Tantalum capacitor nears CPU to reduce voltage ripple, but the technology improvement has introduced an 1000uF very low ESR (Equivalent Serial Resistor) of Electrolytic capacitor with only 0.15 ohm comparing with 0.7 ohm of Tantalum capacitor. The lower the ESR and higher the capacitance value, the smaller the CPU voltage ripple.

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Following are the specifications of capacitors that AOpen is currently using:

Tantalum: SPRAGUE 100uF,
 Part number 595D107X06R3C2T,
 Max ESR is 0.7 at 25 degree 100KHz.
Electrolytic: SANYO 1000uF,
 Part number 16MV1000CG,
 Max ESR is 0.15 at 20 degree 100khz.

Also, more capacitors are not exactly equal to better CPU voltage, it depends on where you put your capacitor (the layout). The most accurate way is to use storage scope to measure the CPU voltage directly, but of course, it is difficult for end user to do so. AOpen design team follows Intel, AMD and Cyrix's design specification strictly, it is approved by Intel, AMD and Cyrix..

Q: Why the AOpen mainboards (MB) do not have cache module expansion slot?

A: Faster CPU speed requires more difficult and complex MB timing design. Every trace and components delay must be taken into consideration. The expansion cache slot design will cause 2 or 3ns delay in PBSRAM timing, and the extended trace length to the cache module through the golden finger will further delay the timing by 1 or 2ns. This may result in unreliable system once the cache module and slot becomes worn. All AOpen MBs support 512KB PBSRAM onboard. For better performance (around 3% higher than 256KB), we strongly recommend you to use 512KB onboard. Otherwise, reliable 256KB is better than unreliable 512KB with cache module. AOpen is the first company to promote this concept since the fourth quarter of 1995.